

MODEL (1)

First: Choose the correct answer from the given :

- 1** The point (-3, 4) lies in quadrant:
 A first B second C third D fourth

- 2** The positive square root of mean of the squares of deviations of values from its arithmetic mean is called.
 A The range B the arithmetic mean
 C The standard deviation D the mode

- 3** If $3a = 4b$, then $a:b = \dots\dots\dots$
 A 3:4 B 4:3 C 3:7 D 4:7

- 4** If $n(x)=2$, $n(y^2)=9$, then $n(x \times y) = \dots\dots\dots$
 A 6 B 18 C 11 D 7

- 5** The range of the set of the values 7, 3, 6, 9 and 5 =
 A 3 B 4 C 6 D 12

- 6** If $y \propto x$ and $y = 2$ when $x = 8$, then $y = 3$ when $x = \dots\dots\dots$
 A 16 B 12 C 24 D 6

Second:

- A** If $X \times Y = \{(2, 2), (2, 5), (2, 7)\}$. Find

First: Y .

Second: $Y \times X$

- B** If a, b, c and d are proportional prove that:

$$\frac{a}{b-a} = \frac{c}{d-c}$$

Third:

- A If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where aRb means " $2a = b$ " for all $a \in X$, $b \in Y$.

First: Write R and represent it by an arrow diagram.

Second: Show that R is a function.

- B Find the number that if we add to each terms of the ratio 7:11 it becomes 2:3.

Fourth:

- A If $X = \{1, 3, 5\}$ and R is a relation on X , where $R = \{(a, 3), (b, 1), (1, 5)\}$. Find:

First: The range of the relation.

Second: The value of $a + b$.

- B If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$. Find:

First: The relation between x, y .

Second: The value of y when $x = 1.5$.

Fifth:

- A Represent graphically the function $f(x) = (x-3)^2$, $x \in [0, 6]$ from the graph deduce the vertex of the curve, minimum value of the function, equation of the axis of symmetry.

- B Calculate the arithmetic mean and the standard deviation of the set of values 8, 9, 7, 6 and 5.

ANSWER MODEL (1)

QUESTION (1)

(1) Second

(2) The standard deviation

(3) $3a = 4b \Rightarrow a : b = 4 : 3$

(4) $n(x \times y) = n(x) \times n(y) = 2 \times 3 = 6$

(5) The range = max – mini = $9 - 3 = 6$

(6) $\frac{2}{3} = \frac{8}{x} \Rightarrow x = \frac{8 \times 3}{2} = 12$

QUESTION (2)

(a) $Y = \{2, 5, 7\}$, $X = \{2\}$

$$\begin{aligned} Y \times X &= \{2, 5, 7\} \times \{2\} \\ &= \{(2, 2), (5, 2), (7, 2)\} \end{aligned}$$

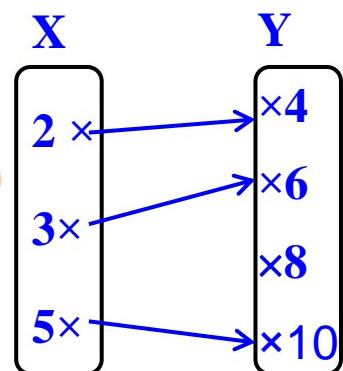
(b) $\frac{a}{b} = \frac{c}{d} = m \Rightarrow a = mc$, $b = md$

$$\frac{a}{b-a} = \frac{mc}{md-mc} = \frac{\cancel{mc}}{\cancel{m}(d-c)} = \frac{c}{(d-c)}$$

QUESTION (3)

(a) $R = \{(2,4), (3,6), (5,10)\}$

R is a Function because each element of the set X appears only once as a first projection in one of the ordered pairs of the relation



(b) Let the number $= x$

$$\frac{x+7}{x+11} = \frac{2}{3} \Rightarrow 3(x+7) = 2(x+11)$$

$$3x + 21 = 2x + 22 \Rightarrow 3x - 2x = 22 - 21$$

$$\therefore x = 1 \quad \therefore \text{the number is } 1$$

QUESTION (4)

(a) The range $= \{3, 1, 5\}$

$\because R$ is a relation (function) on X

$\therefore a = 3$ or 5 and $b = 5$ or 3

$$a + b = 3 + 5 \text{ or } 5 + 3 = 8$$

(b) $Y \propto \frac{1}{x} \Rightarrow Y = \frac{m}{x} \Rightarrow m = y x = 3 \times 2 = 6$

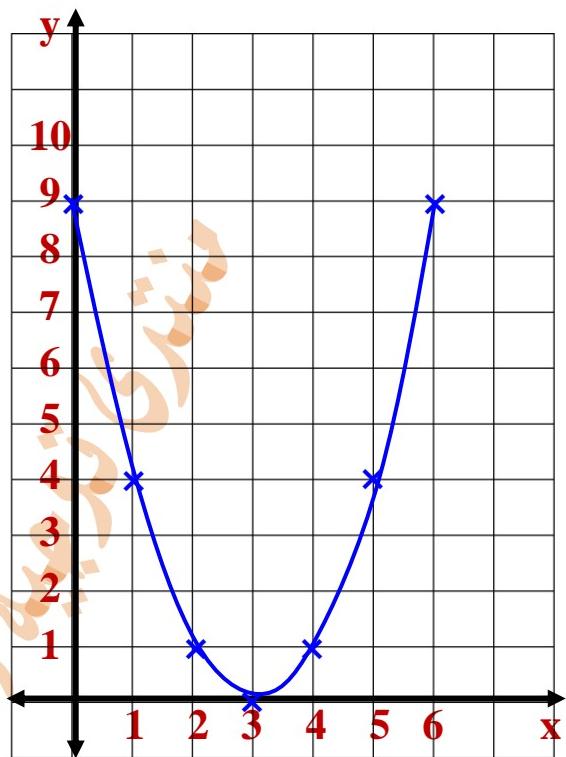
The relation $Y = \frac{6}{x}$

When $x = 1,5 \quad \therefore y = \frac{6}{1,5} = 4$

QUESTION (5)

(a)

X	$Y = (x - 3)^2$	y
0	$Y = (0 - 3)^2$	9
1	$Y = (1 - 3)^2$	4
2	$Y = (2 - 3)^2$	1
3	$Y = (3 - 3)^2$	0
4	$Y = (4 - 3)^2$	1
5	$Y = (5 - 3)^2$	4
6	$Y = (6 - 3)^2$	9



The vertex of the curve $(3, 0)$

The equation of symmetrical axis: $x = 3$

The minimum value = 0

$$(b) \bar{x} = \frac{9 + 8 + 7 + 6 + 5}{5} = 7$$

x	$x - \bar{x}$	$(x - \bar{x})^2$
8	$8 - 7 = 1$	1
9	$9 - 7 = 2$	4
7	$7 - 7 = 0$	0
6	$6 - 7 = -1$	1
5	$5 - 7 = -2$	4
total		10

$$\sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{n}} = \sqrt{\frac{10}{5}} = \sqrt{2}$$

MODEL (2)

First: Choose the correct answer from the given :

- 1** The point (3 , 4) lies in quadrant:
 A first B second C third D fourth
- 2** is one of the measures of the dispersions.
 A The median B The arithmetic mean
 C The standard deviation D The mode
- 3** The third proportion of the two numbers 3 and 6 is
 A $\frac{1}{2}$ B 9 C 2 D 12
- 4** If $n(x) = 2$, $n(y \times x) = 6$, then $n(y^2) = \dots$.
 A 4 B 9 C 16 D 12
- 5** The range of the set of the values 7, 3, 6, 9 and 5 =
 A 3 B 4 C 6 D 12
- 6** If $xy = 7$, then $y \propto = \dots$.
 A $\frac{1}{x}$ B $x - 7$ C x D $x + 7$

Second:

- A If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$. Find:

First: $n(X \times Z)$.

Second: $(Y \cap X) \times Z$.

- B If b is a middle proportional between a and c prove that:

$$\frac{a-b}{a-c} = \frac{b}{b+c}$$

Third:

- A If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where $a R b$ means $a + b = 7$ For all $a \in X, b \in Y$.

First: Write R and represent it by an arrow diagram.

Second: Show that R is a function.

- B If $5a = 3b$. Find the value of: $\frac{7a + 9b}{4a + 2b}$

Fourth:

- A If $f(x) = 4x + b$ and $f(3) = 15$ find the value of b .
 B If $y \propto x$, $y = 6$ when $x = 3$. Find:

First: The relation between X, Y .

Second: The value of y when $X = 5$.

Fifth:

- A Represent graphically the function $f(x) = 4 - x^2$, $x \in [-3, 3]$ from the graph deduce the vertex of the curve, maximum value of the function, equation of the axis of symmetry.
 B The following frequency distribution shows the number of children of some families in a new city:

Number of children	0	1	2	3	4	sum
Number of families	6	15	40	25	14	100

Calculate the mean and the standard deviation to the number of children.

ANSWER MODEL (1)

QUESTION (1)

- (1) First
- (2) The standard deviation
- (3) $\frac{(6)^2}{3} = \frac{36}{3} = 12$
- (4) $n(y) = \frac{6}{2} = 3 \Rightarrow n(y)^2 = (3)^3 = 9$
- (5) The range = max – mini = 9 – 3 = 6
- (6) $y \propto \frac{1}{x}$

QUESTION (2)

- (a) $n(x \times z) = n(x) \times n(z) = 2 \times 1 = 2$
 $(y \cap x) \times z = \{2\} \times \{3\} = \{(2, 3)\}$
- (b) $\frac{a}{b} = \frac{b}{c} = m \quad b = cm, \quad a = cm^2$

$$\frac{a - b}{a - c} = \frac{cm^2 - cm}{cm^2 - c} = \frac{mc(m-1)}{c(m-1)(m-1)} = \frac{m}{(m-1)}$$

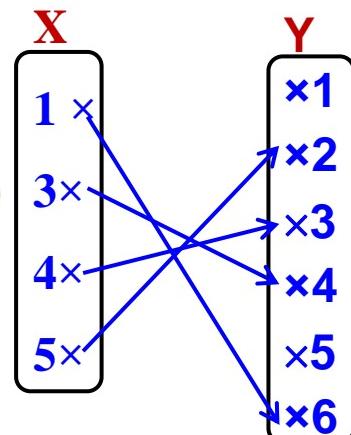
$$\frac{b}{b-c} = \frac{cm}{cm - c} = \frac{mc}{c(m-1)} = \frac{m}{(m-1)}$$

$$\therefore \frac{a-b}{a-c} = \frac{b}{b-c}$$

QUESTION (3)

(a) $R = \{(1, 6), (3, 4), (4, 3), (5, 2)\}$

R is a Function because each element of the set X appears only once as a first projection in one of the ordered pairs of the relation



(b) $5a = 3b \Rightarrow \frac{a}{b} = \frac{3}{5} = m \Rightarrow a = 3m, b = 5m$

$$\frac{7a + 9b}{4a + 2b} = \frac{7 \times 3m + 9 \times 5m}{4 \times 3m + 2 \times 5m} = \frac{21m + 45m}{12m + 10m} = \frac{66m}{22m} = 3$$

QUESTION (4)

(a) $F(x) = 4x + b$

$$F(3) = 4 \times 3 + b = 15 \Rightarrow b = 15 - 12 = 3$$

(b) $Y \propto x \Rightarrow Y = mx \Rightarrow 6 = 3 \times m$

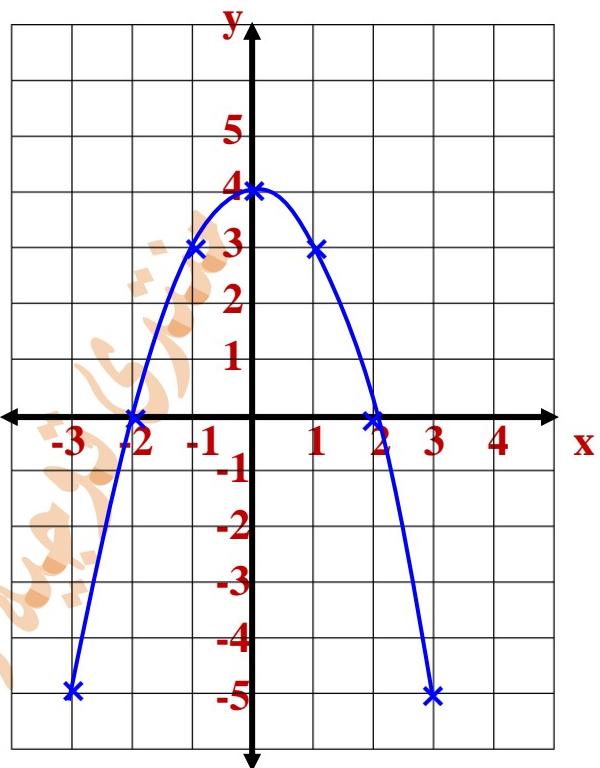
$$\therefore m = 2 \Rightarrow \text{The relation } Y = 2x$$

When $x = 5 \quad \therefore y = 2 \times 5 = 10$

QUESTION (5)

(a)

X	$Y = 4 - x^2$	y
-3	$Y = 4 - (-3)^2$	-5
-2	$Y = 4 - (-3)^2$	0
-1	$Y = 4 - (-3)^2$	3
0	$Y = 4 - (-3)^2$	4
1	$Y = 4 - (-3)^2$	3
2	$Y = 4 - (-3)^2$	0
3	$Y = 4 - (-3)^2$	-5



The vertex of the curve $(0, 4)$

The equation of symmetrical axis: $x = 0$

The maximum value = 4

(b)

x	K	$X \times k$	$x - x\bar{}$	$(x - x\bar{})^2$	$k \cdot (x - x\bar{})^2$
0	6	0	$0 - 2,26 = -2,26$	5,1076	30,6456
1	15	15	$1 - 2,26 = -1,26$	1,5876	23,814
2	40	80	$2 - 2,26 = -0,26$	0,0676	2,704
3	25	75	$3 - 2,26 = 0,74$	0,5476	13,69
4	14	56	$4 - 2,26 = 1,74$	3,0276	42,3864
total	100	226			113,24

$$x\bar{} = \frac{\sum (x \cdot k)}{\sum k} = \frac{226}{100} = 2,26$$

$$\sigma = \sqrt{\frac{k \cdot \sum (x - x\bar{})^2}{\sum k}} = \sqrt{\frac{113,24}{100}} = 1,06$$

MODEL (3)

لطلاب الدمج الإجابة في نفس الورقة

First: Complete:

(For the special needs)

- 1 The point (5, 3) lies in quadrant **first**
- 2 $n(x) = X^3 + 8$ is called a polynomail of degree **thert**
- 3 The range of the set of the values 4, 14, 25, and 34 is **$34 - 4 = 29$**
- 4 If $y = 2x$, then $y \propto$ **$y \propto x$**
- 5 If $X = \{2, 4, 6\}$, then $n(x^2) = \underline{n(x) = 3} \Rightarrow n(x^2) = 9$
- 6 If $(a, 3) = (6, b)$, then $a + b = \underline{6 + 3 = 9}$

Second: Choose the correct answer:

- 1 If $xy = 7$, then $y \propto$

A $\frac{1}{x}$	B $x - 7$	C x	D $x + 7$
-----------------	-----------	-------	-----------
- 2 If 2, 3, 6 and X are proportional , then $x =$

A 9	B 18	C 12	D 3
-----	------	------	-----
- 3 If $2a = 5b$, then $\frac{a}{b} =$

A $\frac{-5}{2}$	B $\frac{-2}{5}$	C $\frac{2}{5}$	D $\frac{5}{2}$
------------------	------------------	-----------------	-----------------
- 4 is one of the measures of the dispersions

A the arithmetic mean	B The range
C the mode	D The median

answer to the samples of the book tests Algebra of the third prep 1 term

5 If $n(x) = 5$, $n(x \times Y) = 10$, then $n(Y) = \dots\dots$

A 4

B 3

C 2

D 1

6 If $x = \{1\}$, then $x^2 = \dots\dots$

A 1

B $\{(1,1)\}$

C $\{(1,1)\}$

D $\{1\}$

Third: Put (✓) or (✗):

1 If the relation of $f = \{(1, 3), (2, 4), (3, 3)\}$, then the domain of the function $\{1, 2, 3\}$ (✓)

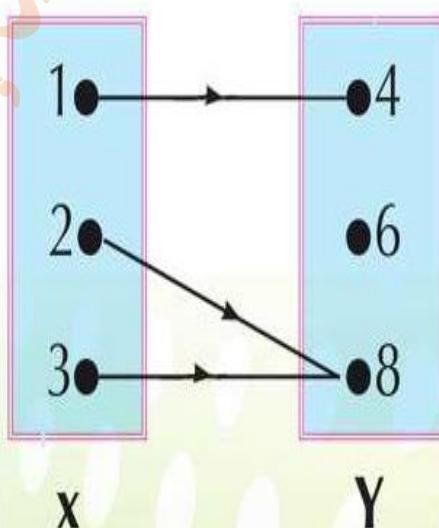
2 If $y \propto x$ and $y = 6$ when $x = 3$, then $y = 2$ when $x = 4$ (✗)

3 If $\sum(x - \bar{x})^2 = 36$ for a set of values whose number equals 9, then $\sigma^2 = 4$ (✗)

4 The intersection point of the straight line $f(x) = x + 2$ with x-axis is the point $(-2, 0)$ (✓)

5 If $f: x \rightarrow Y$ then x is called the domain of this function (✓)

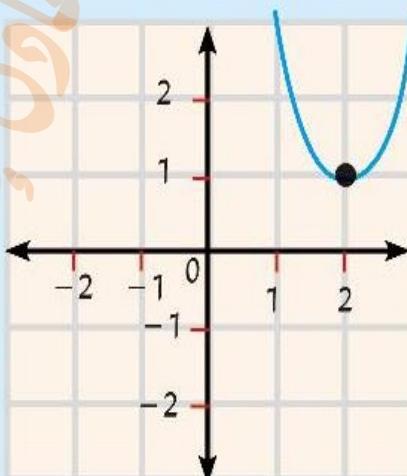
6 The arrow diagram from X to Y is a function (✓)



answer to the samples of the book tests Algebra of the third prep 1 term

Fourth: join from Column (A) to Column (B):

A		B
1 If $(1, 4) \in \{2, x\} \times \{1, 4\}$ Then $x = \dots$	<u>1</u>	● 6
2 If The Function f Which $f(x) = x - 4$ is represented graphically By a Straight Line Passes therough the Point $(a, 2)$ Then $A = \dots$	<u>6</u>	● 1
3 $\frac{1}{2} = \frac{3}{6} = \frac{4}{8} = \dots$	<u>8</u>	● 10
4 If $f(x) = 5$, then $f(5) + f(-5) = \dots$	<u>10</u>	● ± 6
5 The third proprotional of the two numbers 4 and 9 is	<u>± 6</u>	● 2
6 In the opposite figure the equation of the little of symmetry is $x = \dots$	<u>2</u>	● 8



ALGEBRA – MODEL NO**1****Q1 A) Choose the correct answer:**

- (1) The third proportion between 3 , 6 is
 a) $\frac{1}{2}$ b) 2 c) 9 d) 12
-
- (2) If $Y = 4 X$, then.....
 a) $Y \propto \frac{1}{x}$ b) $X \propto \frac{1}{y}$ c) $Y \propto X$ d) Other wise
-
- (3) $F(x) = x(3x + 2)^2$ is a function of Degree
 a) First b) Second c) Third d) fourth
-

B): If $X = \{1, 3, 5\}$, $Y = \{4, 5\}$, Find $(X \cap Y) \times (X \cup Y)$ **Q2 A) Choose the correct answer:**

- (1) If $X = \{7\}$, $Y = \{5\}$, then $n(X \times Y) = \dots$
 a) Zero b) 1 c) 2 d) 35
-
- (2) The difference between the greatest value and the smallest value of a set of data is
 a) The mean b) The range c) The median d) The mode
-
- (3) The arithmetic mean for the values 7 , 3 , 6 , 9 , 5 equal
 a) 3 b) 4 c) 6 d) 12
-

B): If B is a middle proportion between A , C, prove that:

$$\frac{A^2 + B^2}{B^2 + C^2} = \frac{A}{C}$$

Q3

A) If $X = \{ 1, 2, 4 \}$, $Y = \{ 4, 5, 2, 7 \}$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $a + b = 6$ " for $a \in X, b \in Y$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Prove that R is a function and write its range
-

B) If $\frac{X}{2} = \frac{Y}{3} = \frac{Y - X}{5k}$, find the value of k ?

Q4

A) If $Y \propto \frac{1}{X}$ and $Y = 8$ when $X = 3$. Find the relation between Y and X then find value of Y when $X = 4$.

B) Find the standard deviation for the values $12, 13, 16, 18, 21$

Q5

A) If the straight line which represents $\mathcal{F}: \mathcal{R} \rightarrow \mathcal{R}$, $\mathcal{F}(x) = 6x + K$ cut Y -axis at point $(m, 3)$, find the value of m, K .

B) Graph the function $\mathcal{F}(x) = (x - 2)^2$ where $x \in [-1, 5]$ and from graph find:

- ① The coordinates of vertex
- ② The maximum value of function
- ③ The equation of the axis of symmetry



End of the questions

ALGEBRA – MODEL No 2**Q1 A) Choose the correct answer:**

(1) Which of the following from the dispersion measurement?

- a) Median b) Mean c) Range d) Mode

(2) If $X \propto Y$, $X = \dots$, where $m \neq 0$

- a) $m + Y$ b) $\frac{m}{y}$ c) $\frac{1}{m y}$ d) $m \times y$

(3) For any two sets A , B, the set { (x,y) : $x \in A$, $y \in B$ } represents

- a) $n (A \times B)$ b) $A \times B$ c) $n (B \times A)$ d) $B \times A$
-

B): Find the arithmetic mean and the standard deviation for the set of values: 7 , 12 , 6 , 15 , 10**Q2 A) Choose the correct answer:**

(1) Which value of a make the range of the set of the following values 53 , a , 85 , 57 , 60 , 55 equal 9 :

- a) 63 b) 61 c) 51 d) 50

(2) If $3 , x , \frac{1}{y} ,$ are proportional quantities, then = 3

- a) $X^2 Y$ b) Y c) $X Y$ d) $\frac{x^2}{y}$

(3) If $F(x) = n X^2 + 2 X^n - 3 ,$ then the possible value of n which make $F(x)$ if function of second degree is

- a) { 2 , 3 } b) { 1 , -1 } c) { 2 , 1 , 0 } d) { 2 , 1 }
-

B): If $Y \propto \frac{1}{x} ,$ and $Y = 6$ when $X = 2,$ find the value of X when $Y = \frac{3}{4}$

Q3

A) If $\frac{x}{5} = \frac{y}{3} = \frac{z}{6}$, prove that: $\frac{2x+y-z}{7} = \frac{y+z}{9}$

B) If $X = \{1, 4, 7\}$, $Y = \{-1, 1, 4, 7\}$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $|a + b| = 6$ " for $a \in X, b \in Y$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? Give reason.
-

Q4

A) If a, b, c, d are in continued proportion,

Prove That: $\frac{c^2+a}{b} = \frac{d^2+c}{d}$

B) Graph the function $\mathcal{F}: \mathbb{R} \rightarrow \mathbb{R}$, $\mathcal{F}(x) = 2x - 4$

- ① From the graph find the intersection points with X-axis and Y-axis
 - ② If: $\mathcal{F}(a) = 20$, find the value of a
-

Q5

- The curve represents a function of second degree \mathcal{F} :

① Write the domain of \mathcal{F}

Use the graph to find:

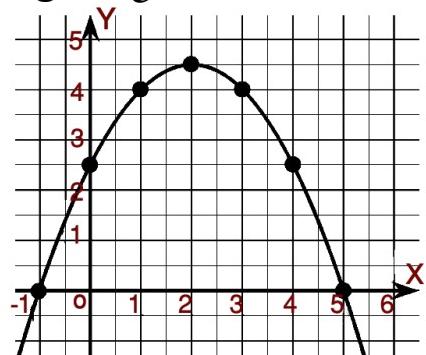
② The range of the function \mathcal{F}

③ The equation of the line of symmetry

④ The maximum value of \mathcal{F}

⑤ The value of $\mathcal{F}(1)$

⑥ If $\mathcal{F}(x) = a(x - 2)^2 + K$, then find the numerical value of $a + k$



ALGEBRA – MODEL NO**3****Q1 A) Choose the correct answer:**

- (1) The difference between the greatest and smallest value is
- a) Median b) Mean c) Range d) Mode
- (2) If $\mathcal{F}: \mathcal{R} \rightarrow \mathcal{R}$, $\mathcal{F}(x) = 3$, then $\frac{f(6)}{f(0)} = \dots$
- a) 6 b) 1 c) 3 d) Undefined
- (3) Which of the following represents inverse variation?
- a) $Y = X$ b) $Y = X^2$ c) $X Y^2 = 1$ d) $Y = \frac{3}{y}$
-

B): If $X = \{2, 3\}$, $Y = \{3, 4\}$, $Z = \{4, 5\}$, find:

- ① $Z \times (X \cap Y)$
 ② $(Z - Y) \times X$
-

Q2 A) Choose the correct answer:

- (1) If the point $(X + 1, X - 3)$ lies on X-axis, then $X =$
- a) -1 b) Zero c) -2 d) 3
- (2) If $A(a, 4)$ satisfies the function $\mathcal{F}: \mathcal{R} \rightarrow \mathcal{R}$, $\mathcal{F}(x) = 2x + b$, then $6a + 3b = \dots$
- a) 12 b) 9 c) 6 d) 3
- (3) If $X \times Y = \{(1,2), (1,3), (1,4)\}$, then $n(x) + 2(Y^2) = \dots$
- a) 3 b) 4 c) 6 d) 10
-

B): If $X, 2, 4, 2Y$ are in continued proportion.Find the value of $X + Y$

Q3

A) If $X = \{-2, -1, 0, 1\}$, $Y = \{-1, 0, 1, 2, 4\}$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $b = a^2$ " for $a \in X, b \in Y$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? Give reason.
-

B) The following values for five students in exam: **8, 9, 6, 12, 10**

Find: ① The arithmetic mean ② The standard deviation

Q4

A) Graph the function $\mathcal{F}(x) = x(x - 2) - 3$ where $x \in [-2, 4]$ and from graph find:

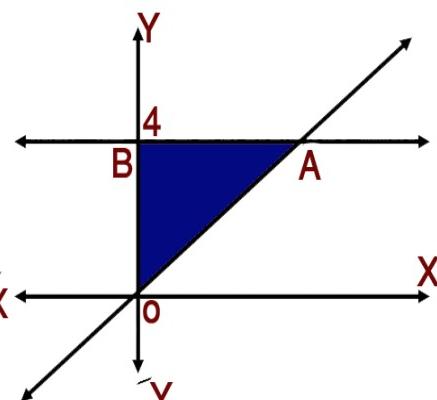
- ① The coordinates of vertex
 - ② The maximum or minimum value of function
 - ③ The equation of the axis of symmetry
-

B) If $\frac{a+b}{5} = \frac{b+c}{3} = \frac{c+a}{6}$, prove that: $\frac{a+b+c}{a-c} = \frac{7}{2}$

Q5

A) If $Y = 2 + b$, where $b \propto X$ and $X = 1$ when $Y = 5$, find the relation between X, Y then find the value of Y when $X = 2$

B) The opposite figure shows the \overrightarrow{AB} which represents the function $\mathcal{F}(x) = 4$, if \overrightarrow{OA} represents the linear function $G(x) = nx + k$ and the area of the triangle ABO equals 4 square units, then find the value of n, k where O is the origin point.



End of the questions

ALGEBRA – MODEL NO**4****Q1 A) Choose the correct answer:**

(1) If $X = \{ 1, 3, 5 \}$, R if function on X , $R = \{ (a,3), (b,1), (1,5) \}$
then $a + b = \dots\dots\dots$

- a) 4 b) 6 c) 8 d) 2
-

(2) If $(L - 3, 2)$ lies in first quadrant, then L may be equals $\dots\dots\dots$
a) -3 b) 2 c) 7 d) Zero

(3) If $2a = 3b$, then $\frac{3a}{2b} = \dots\dots\dots$
a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) $\frac{9}{4}$ d) $\frac{4}{9}$

B): If $X^2 Y^2 - 4XY = -4$, prove that X is varies inverse with Y.

Q2 A) Choose the correct answer:

(1) The simplest dispersion measurement is $\dots\dots\dots$

- a) Mean b) Median c) Standard deviation d) range
-

(2) If $(a, 2) \in$ Straight line $Y = 3X - 4$, then $a = \dots\dots\dots$

- a) 2 b) 3 c) 4 d) 7
-

(3) If $n(x) = 2$, $n(X \times Y) = 8$, then $n(Y^2) = \dots\dots\dots$

- a) 4 b) 2 c) 16 d) 8
-

B): Find the number which if it added to the two terms of the ratio 7:11 it will be 2 : 3 .

Q3

A) Find the standard deviation for the values: 2 , 5 , 6 , 8 , 9

B) The straight line which represents $\mathcal{F}: \mathbb{R} \rightarrow \mathbb{R}$ where $\mathcal{F}(x) = 3x + a$ cut Y-axis at the point (b , 7). **Find** the value of $2a - 5b$

Q4

A) If $\frac{a}{4} = \frac{b}{5} = \frac{c}{3}$, **prove that:** $\frac{a-b+c}{a+b-c} = \frac{1}{3}$

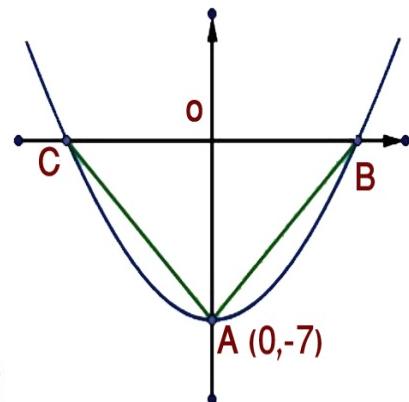
B) If $X = \{ 1 , 2 \}$, $Y = \{ 0 , 2 , 3 \}$ and \mathcal{R} is a relation from X to Y where **a** \mathcal{R} **b** means "a + b is odd number" for $a \in X$, $b \in Y$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? Give reason.
-

Q5

A) If $(3 - x , Y + 2) = (-4 , 4)$, **Find** the value of $\sqrt{x + y}$

B) The opposite figure represents the curve of the function $\mathcal{F} : \mathcal{F}(x) = Lx^2 - 7$, the area of the $\Delta ABC = 21$ square units, **A** (0 , -7). **Find** the coordinate of the point B, and then **find** the value of L.



◆ ◆ ◆

End of the questions

ALGEBRA – MODEL NO**5****Q1 A) Choose the correct answer:**

- (1) If $5X = 9Y$, then $\frac{3x}{2y} = \dots$
 a) $27:10$ b) $9:5$ c) $5:9$ d) $81:25$
- (2) The opposite figure represents a curve of quadratic function, if point A $(-4, 0)$, then the equation of line of symmetry is $X = \dots$
 a) 1 b) -1 c) -2 d) Zero
- (3) The number that it is added to each of the numbers $1, 3, 6$ it becomes proportional is \dots
 a) 4 b) 3 c) 2 d) 1
-

B): If B is mean proportional between A , C.

$$\text{Prove that: } \frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$$

Q2 A) Choose the correct answer:

- (1) If $\mathcal{F}(X+3) = X-3$, then $\mathcal{F}(7) = \dots$
 a) 4 b) 1 c) 7 d) 10
- (2) If $\sum(X-\bar{X})^2 = 36$ for nine of the values, then the standard deviation equals \dots
 a) 2 b) 18 c) 27 d) 4
- (3) If $\mathcal{F}(x) = 3$, then $\mathcal{F}(2) - \mathcal{F}(7) = \dots$
 a) 5 b) -5 c) Zero d) -4
-

B): If $X = \{4, 5, 7\}$ and \mathcal{R} is function on X and $\mathcal{R} = \{(a,5), (b,5), (4,7)\}$

- ① Find the numerical value of $3a + 2b$
- ② The range of the function

Q3

A) If $\frac{a}{4x+y} = \frac{b}{x-4y}$, prove that: $\frac{a+b}{5x-3y} = \frac{a-b}{3x+5y}$

B) Find the standard deviation for the values: 12 , 13 , 16 , 18 , 21

Q4

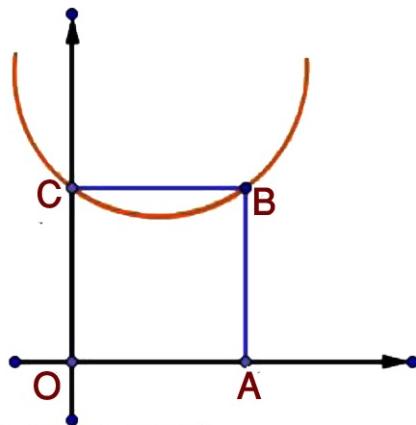
A) The opposite figure:

Represents the quadratic function

$$\mathcal{F}: \mathcal{F}(x) = x^2 - (k-2)x - k + 4$$

If ABCO is a square

Find the value of K



B) If $Y = 1 + b$ where b varies inverse with square of X , and $X = 1$ where $Y = 5$. Find the relation between X , Y then find the value of Y when $X = 2$

Q5

A) If $\mathcal{F}(x) = a + x^2$, $\mathcal{L}(x) = c$ are two polynomial function where a, c are two constant and $3\mathcal{F}(2) + 3\mathcal{L}(x) = 6$, find the numerical value of $2\mathcal{F}(0) + 2\mathcal{L}(7)$

B) If $X = \{3, 5, 7\}$, $Y = \{X : X \in N, 10 < X < 30\}$ and the function \mathcal{F} from $X \rightarrow Y$ where $\mathcal{F} = \{(3,9), (5,15), (7,21)\}$
Find: ① The domain of \mathcal{F} ② Write the rule of \mathcal{F}



End of the questions

ALGEBRA – MODEL NO**6****Q1 A) Choose the correct answer:**

- (1) If the point ($X-3$, $2 - X$) lies in fourth quadrant, then $X = \dots\dots\dots$
 a) 4 b) 3 c) 2 d) 1
-
- (2) If $\mathcal{F}(x) = Kx + 8$, $\mathcal{F}(2) = \text{zero}$, then $K = \dots\dots\dots$
 a) 8 b) 6 c) 4 d) -4
-
- (3) If $a, 2, 4, b$ are in continued proportion, then $a + b = \dots\dots\dots$
 a) 2 b) 4 c) 6 d) 9
-

B): If b is mean proportion between a , c

Prove that:
$$\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$$

Q2 A) Choose the correct answer:

- (1) If $Y \propto X$, $Y \propto \frac{1}{Z}$, then $Y \propto \dots\dots\dots$
 a) XZ b) $\frac{z}{x}$ c) $\frac{x}{z}$ d) $X^2 z$
-
- (2) The standard deviation of the values 5 , 5 , 5 , 5 is
 a) Zero b) 5 c) 6 d) 2
-
- (3) The function $F(x) = X^2 - (X - 3)^2$ of degree
 a) Zero b) First c) Second d) Third
-

**B): The point (-1 , 2) is the vertex of the curve $\mathcal{F}(x) = a x^2 - 6x + c$.
find the value of C**

Q3

- A)** If $3a = 4b = 6c$, find $a : b : c$ then find the numerical value of the expression $\frac{3a+2b}{a+4c}$
-

- B)** If $X = \{-2, -1, 0, 1, 2\}$, and \mathcal{R} is a relation on X where $a \mathcal{R} b$ means "a is additive inverses of b" for $a, b \in X$:
- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? Give reason.
-

Q4

- A)** If $X = Z + 8$, Z varies inverse with Y and $Z = 2$ when $Y = 3$. Find the relation between X, Y then find the value of Y when $X = 3$
-

- B)** If $\mathcal{F}(x) = 2x + 5$, $\mathcal{G}(x) = x - 6$. Prove that $\mathcal{F}(2) + 3\mathcal{G}(3) = 0$
-

Q5

- A)** Find the arithmetic mean and standard deviation for the values $5, 7, 8, 9, 6$
-

- B)** If $(X - 2, 2^{Y-1}) = (3, 1)$, find the value of X, Y
-

◆ ◆ ◆

End of the questions

ALGEBRA – MODEL NO**7****Q1 A) Choose the correct answer:**

(1) The range of the values 7 , 3 , 6 , 9 , 5 equals

- a) 3 b) 4 c) 6 d) 12
-

(2) $a : b = a^2 : \dots$, $a \neq b \neq zero$

- a) b^2 b) $a b$ c) $a^2 b$ d) $a b^2$
-

(3) If $X = [0,5]$, $Y = [-3,2[$, then $(-2,4) \in \dots$

- a) X^2 b) Y^2 c) $X \times Y$ d) $Y \times X$
-

B): If b is mean proportion between a , c

Prove that: $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

Q2 A) Choose the correct answer:(1) The relation represents inverse variation between Y , X is

- a) $Y = 5 X$ b) $\frac{x}{5} = \frac{4}{y}$ c) $\frac{x}{5} = \frac{y}{3}$ d) $Y = X + 3$
-

(2) If $X = \{1,2,3\}$, $R = \{ (a , b) : a \in X , b \in Y \}$ then number of elements in R equals

- a) 12 b) 9 c) 6 d) 3
-

(3) If the curve of the function $\mathcal{F}: \mathcal{F}(x) = x^2 + b x - 3$ cut form negative part of X-axis only one units, then $b = \dots$

- a) b) c) d)
-

B): If $(\sqrt{x-1}, 11) = (4, Y+3)$, find the value of $\sqrt{x+y}$

Q3

- A)** If $\mathcal{F}: \mathcal{F}(x) = x^2 + bx + c$, and $\mathcal{F}(2) = 2$ when $x \in \{0, 3\}$. Find the value of b, c .
-

- B)** Find the standard deviation for the values **5, 7, 8, 14, 16**
-
-

Q4

- A)** If $X = \{-1, 0, 1\}$, and \mathcal{R} is a relation on X where $a \mathcal{R} b$ means " $b = a^2$ " for $a, b \in X$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? If R is a function, find its range.
-

- B)** If $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, prove that: $\frac{2y-z}{3x-2y+z} = \frac{1}{2}$
-
-

Q5

- A)** If $\mathcal{F}: \mathcal{F}(x) = ax^2 + 5x + 7$, if linear function, find the value of a then find $\mathcal{F}(-1)$.
-

- B)** If the weight of a body on the moon (**W**) is directly proportional with its weight on the ground (**R**), if the body weight **84** kg, on the ground and its weight on the moon is **14** kg. What will its weight be on the moon if its weight on the ground **144** kg?

◆ ◆ ◆

End of the questions

ALGEBRA – MODEL NO**8****Q1 A) Choose the correct answer:**

- (1) If $X = \{12\}$, then $n(X^2) = \dots$
 a) 1 b) 2 c) 4 d) 144
- (2) If $(a, a) \in \mathcal{F}, \mathcal{F}(x) = 2x - 3$, then $a = \dots$
 a) Zero b) 1 c) 2 d) 3
- (3) If the range of the values 7, 3, 6, K, 5 is 6, then $K = \dots$
 a) 3 b) 6 c) 9 d) 12
-

B): If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{6, 5\}$, find :

$$\textcircled{1} X \times (Y \cap Z) \quad \textcircled{2} (X - Y) \times Z$$

Q2 A) Choose the correct answer:

- (1) If $X = [-2, 2]$, $Y = [0, 4]$, then $(-2, -1) \in \dots$
 a) X^2 b) Y^2 c) $X \times Y$ d) $Y \times X$
- (2) If the quantities $5a, 2, 3b, 7$ are proportional, then $\frac{a}{b} = \dots$
 a) $\frac{3}{7}$ b) $\frac{6}{35}$ c) $\frac{3}{5}$ d) $\frac{3}{2}$
- (3) If $Y - X = \frac{1}{x} - \frac{1}{y}$, where $X \neq Y$ zero, then \dots
 a) $Y \propto \frac{1}{x}$ b) $Y \propto \frac{1}{x^2}$ c) $Y \propto X$ d) $Y \propto X + 1$
-

B): If a, b, c, d are in continued proportion, prove that:

$$\Rightarrow \frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$$

Q3

- A)** If $X = \{-1, 1, 2, \frac{1}{2}\}$ and R is relation on X where $a R b$ means " $b = a^{-1}$ " for $a, b \in X$:

- ① Write R and represents it by arrow diagram
 - ② Is R function or not? If R is a function, find its range.
-

- B)** Find the standard deviation for the values $5, 7, 8, 9, 6$
-
-

Q4

- A)** If the value of speed (V) that water passes through a hose nozzle inversely changes with the square of the hose radius length (r), and $V = 5$ cm/s when $r = 3$ cm. find V when $r = 2.5$ cm
-

- B)** If $\mathcal{F}(x) = ax + b$, and $\mathcal{F}(a) = b$, find the numerical value of $ab^2 + 5$
-
-

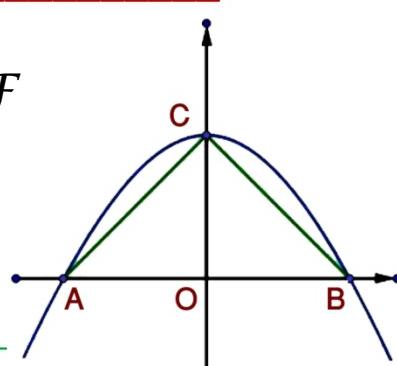
Q5

- A)** If $\frac{a+b}{7} = \frac{b+c}{5} = \frac{c+a}{6}$, find $a : b : c$
-

- B)** The opposite figure represents function \mathcal{F}

Where $\mathcal{F}(x) = 5 - x^2$, find:

- ① The coordinates of points B, C
- ② Area of ΔABC



End of the questions

ALGEBRA – MODEL NO**9****Q1 A) Choose the correct answer:**(1) If $\{2\} \times \{x, y\} = \{(2, 4), (2, 3)\}$, then $X - Y = \dots$

- a) 1 b) -1 c) ± 1 d) Zero

(2) If $F(x) = Kx + 8$, $F(2) = \text{zero}$, then $K = \dots$

- a) 8 b) 1 c) 3 d) -1

(3) If the standard deviation for some of values equals 2, and the number of these values is 2, then $\sum(x - \bar{x})^2 = \dots$

- a) 12 b) 18 c) 24 d) 36
-

B): If $\frac{a}{b-a} = \frac{c}{d-c}$,

Prove that a, b, c, d are proportional quantities

Q2 A) Choose the correct answer:(1) If $\frac{a}{3} = \frac{b}{2} = \frac{2a+b}{x}$, then $x = \dots$

- a) 8 b) 4 c) 3 d) 1

(2) If $3, X, \frac{1}{y}$ are in continued proportional, then $Y \propto \dots$

- a) X b) $\frac{1}{x}$ c) X^2 d) $\frac{1}{x^2}$

(3) The simplest dispersion measurement is

- a) Range b) Median c) Mean d) Mode
-

B): Find the standard deviation for the values 6, 8, 10, 12, 14

Q3

A) If $X = \{1, 2, 3\}$, $Y = \{1, 4, 9, 10\}$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $a = \sqrt{b}$ " for $a \in X, b \in Y$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Prove that \mathcal{R} is a function and write its range
-

B) If the curve of function $\mathcal{F}: \mathcal{R} \rightarrow \mathcal{R}$ where $\mathcal{F}(x) = m - x^2$ cut x-axis in the point $(-2, b)$, find the value of $F(x) = m^b + 2m$

Q4

A) Graph the function $\mathcal{F}(x) = (x - 2)^2$ where $x \in [0, 4]$ and from graph find:

- ① The equation of the axis of symmetry
- ② The maximum value of function

B) IF $Y = 5 + a$, $a \propto X$, find the relation between X, y where $a = 6$ when $X = 2$, then find X when $Y = 8$

Q5

A) If A, b, C, D are in continued proportion, prove that:

$$\left(\frac{a+b}{b+c}\right)^3 = \frac{a}{d}$$

B)

In the opposite figure:

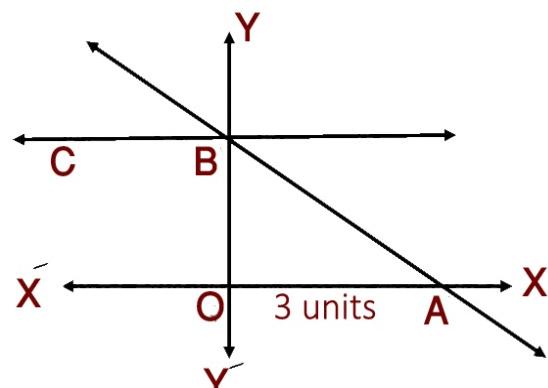
The function \mathcal{F} represents by \overleftrightarrow{AB} ,

$OA = 3$ units, the function $G: G(x) = 6$

Represents by \overleftrightarrow{BC} .

- ① Find the rule of \mathcal{F}

- ② The value of $\mathcal{F}(6) + G(1)$



◆ ◆ ◆

End of the questions

ALGEBRA – MODEL NO**10****Q1 A) Choose the correct answer:**

(1) The range for the values 5 , 14 , 4 , 37 , 15 , 16 ,7 is

- a) 33 b) 32 c) 30 d) 22
-

(2) If $X = \{ 3 , 1 , 5 \}$ and \mathcal{R} is function on X where $\mathcal{R} = \{ (a,3) , (b,1) , (1,5) \}$, then the numerical value of $a + b = \dots$

- a) 4 b) 6 c) 8 d) 10
-

(3) If $b < 3$, then the point $(- 5 , b - 3)$ lies in quadrant

- a) First b) Second c) Third d) Fourth
-

B): If a , b , c , d are in continued proportion, prove that:

$$\Leftrightarrow \frac{a-d}{a+b+c} = \frac{a-2}{a-b}$$

Q2 A) Choose the correct answer:(1) If $a , x , b , 2x$ are proportional, then $\frac{b}{a} = \dots$

- a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) 3 d) 2
-

(2) The relation which represents direct variation between X , Y is ...

- a) $XY = 5$ b) $\frac{x}{5} = \frac{y}{3}$ c) $Y = X + 3$ d) $\frac{x}{5} = \frac{4}{y}$
-

(3) If $\mathcal{F}(X - 4) = X + 3$, then $\mathcal{F}(3) = \dots$

- a) 5 b) 6 c) 10 d) 20
-

B): Find the arithmetic mean and the standard deviation for the values 7 , 12 , 6 , 15 , 10

Q3

- A)** If $X = \{-2, -1, 0, 1, 2\}$, $Y = \{4, 2, \frac{3}{2}, 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}\}$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $b = 2^a$ " for $a \in X, b \in Y$:

- ① Write \mathcal{R} and represents it by arrow diagram
- ② Prove that R is a function and write its range

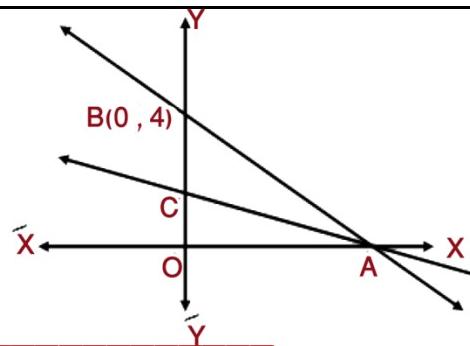
B) If $\frac{x+y}{7} = \frac{y+z}{5} = \frac{x+z}{8}$, prove that: $\frac{x+y+z}{x-z} = 5$

Q4**A) In the opposite figure:**

\overleftrightarrow{AC} represents $F(x) = 2 - \frac{2}{3}X$,

\overleftrightarrow{AB} represents $G(x) = kX + m$

If $B(0, 4)$, find the value of k, m



B) If $2a = 3b = 4c$, find the value of $\frac{a^2 + b^2 + c^2}{a(b+c)}$

Q5**A) If $Y = Z + 5$, and Z varies inverse with X , $Y = 6$ when $X = 2$.**

Find the relation between X, Y then Find value of Y at $X = 1$

B) In the opposite figure:

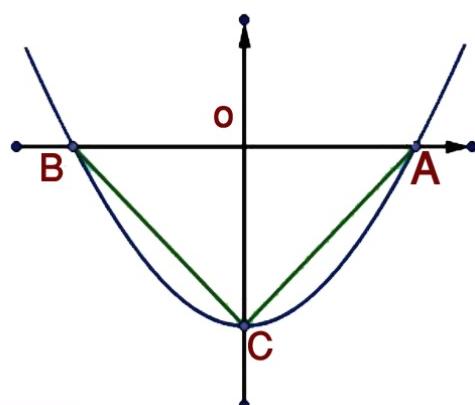
$F: F(x) = x^2 - K$, the triangle ABC

An equilateral triangle its area

Equals $9\sqrt{3}$ square units

Find: ① The value of K

② The coordinate of A, B



End of the questions

ALGEBRA – MODEL NO**11****Q1 A) Choose the correct answer:**

- (1) If $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = 2$, then $\frac{a}{d} = \dots\dots$
 a) 5×2^2 b) 40 c) 10 d) 2×5^3
-
- (2) If $\{2\} \times \{x, y\} = \{(2, 4), (2, 3)\}$, then $X - Y = \dots\dots$
 a) 1 b) -1 c) ± 1 d) Zero
-
- (3) If $(|x|, 4) = (3, Y^2)$, and the point (x, y) lies in the fourth quadrant, then $X + Y = \dots\dots$
 a) 7 b) 1 c) -1 d) -7
-

B): Find the arithmetic mean and the standard deviation for the values 14, 15, 20, 22, 24

Q2 A) Choose the correct answer:

- (1) If $3a = 2b = 4c$, then $a : b : c = \dots\dots$
 a) 3 : 4 : 6 b) 3 : 6 : 4 c) 4 : 6 : 3 d) 4 : 3 : 6
-
- (2) The relation which represents direct variation between X, Y is ...
 a) $X Y = 5$ b) $\frac{x}{5} = \frac{y}{3}$ c) $Y = X + 3$ d) $\frac{x}{5} = \frac{4}{y}$
-
- (3) Selecting a sample of layers of statistical society is called sample
 a) Random b) Class (layer) c) Deliberate d) bunch
-

B): If $X - Y = \{7\}$, $Y - X = \{4, 2\}$, $X \cap Y = \{6\}$, find:

- ① $(X - Y) \times Y$
- ② $(Y - X) \times X$

Q3

A) If $\frac{x+y}{25} = \frac{x-y}{11} = \frac{x+y-z}{8}$, prove that: $X : Y : Z = 18 : 7 : 17$

- B)** If the set of function $\mathcal{F} = \{(0, 5), (2, 3), (3, 2), (4, 1), (1, 4)\}$
- ① Find the domain and range of \mathcal{F}
 - ② Write the rule of \mathcal{F}
-

Q4

A) If B is mean proportional between A, C.

$$\text{Prove that: } \frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c^2}{b^2} = \frac{c}{a}$$

B) If $\mathcal{F}: \mathcal{R} \rightarrow \mathcal{R}$ where $\mathcal{F}(x) = (a - 3)x^2 + bx + 5$ of first degree, $\mathcal{F}(3) = 11$, find the value of a, b

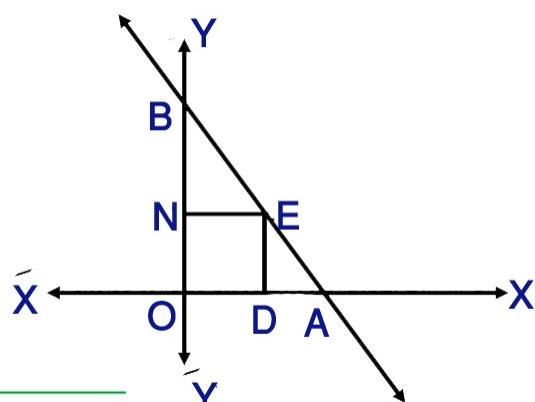
Q5

A) IF $Y = a - 9$, $Y \propto \frac{1}{x^2}$, and $a = 18$ at $x = \frac{3}{2}$, find the relation between X, y then find Y when $X = 1$

B) In the opposite figure:

\overleftrightarrow{AB} represent $\mathcal{F}(x) = KX + m$,
A(3, 0), B(0, 6), ODNE is square

Find: ① The rule of Function \mathcal{F}
② The area of Square ODEN



ALGEBRA – MODEL NO**12****Q1 A) Choose the correct answer:**(1) If the range of the values $2, 7, a, 6$ is 8, $a > 0$, then $a = \dots\dots\dots$

- a) 4 b) 9 c) -1 d) 10
-

(2) If $Y = 3X - 6$, then $Y \propto \dots\dots\dots$

- a) X b) $3X$ c) $X - 2$ d) $X - 6$
-

(3) If the point $(K^2 - 4, K)$ lies on the negative part from Y-axis, then the value of $K = \dots\dots\dots$

- a) ± 2 b) 4 c) -2 d) 2
-

B): Find the arithmetic mean and the standard deviation for the values $8, 9, 7, 6, 5$ **Q2 A) Choose the correct answer:**(1) The maximum value of $F(x) = -2X^2 + 4X + 3$ is $\dots\dots\dots$

- a) 5 b) 1 c) 3 d) -1
-

(2) If $a, 3, 9, b$ are in continued proportion, then $a + b = \dots\dots\dots$

- a) 12 b) 26 c) 27 d) 28
-

(3) If $X = \{3, 1, 5\}$ and \mathcal{R} is function on X where $\mathcal{R} = \{(a, 3), (b, 1), (1, 5)\}$, then the numerical value of $a + b = \dots$

- a) 4 b) 6 c) 8 d) 10
-

B): If $\frac{x+y}{5} = \frac{y+z}{3} = \frac{x+z}{6}$, prove that: $\frac{x-z}{x+y+z} = \frac{2}{7}$

Q3

- A)** If $X = \{ 1, 2, 4, 6, 10 \}$ and \mathcal{R} is relation on X where $a \mathcal{R} b$ means "a is multiple of b" for $a, b \in X$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? Give reason
-

- B)** If B is mean proportional between A, C .

$$\text{Prove that: } \frac{a+b+c}{a^{-1}+b^{-1}+b^{-1}} = b^2$$

Q4

- A)** IF $\mathcal{F}(x) = 5x - b$, $\mathcal{G}(x) = x - 2b$, and $\mathcal{F}(1) + \mathcal{G}(3) = -7$,
Find $\mathcal{F}(3) + \mathcal{G}(1)$
-

- B)** IF $Y = Z + 5$, $Z \propto \frac{1}{x}$, find the relation between X, y where $Y = 6$
when $X = 2$, then find Y when $X = 1$
-

Q5

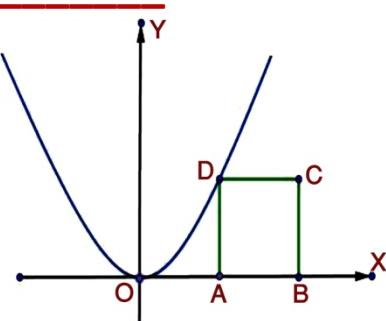
- A)** If $4a^2 + 9b^2 = 12ab$, prove that: a varies directly with b
-

- B)** In the opposite figure:

If $\mathcal{F}(x) = x^2$ and ABCD is square
 $B(6, 0)$, find the area of square ABCD

◆ ◆ ◆

End of the questions



ALGEBRA – MODEL NO**13****Q1 A) Choose the correct answer:**

(1) If the all the values are equals, then

- a) $X - \bar{X} > 0$ b) $X - \bar{X} < 0$ c) $\sigma = 0$ d) $\bar{X} = 0$

(2) If $\frac{y+3}{y} = \frac{x+2}{x}$, $x \neq y \neq 0$, then

- a) $Y \propto X$ b) $Y \propto \frac{1}{x}$ c) $Y \propto X + 2$ d) $Y \propto X + Y$

(3) If $(|x|, 4) = (3, Y^2)$, and the point (x, y) lies in the fourth quadrant, then $X + Y =$

- a) 7 b) 1 c) -1 d) -7

B): Find the arithmetic mean and the standard deviation for the values 73 , 54 , 62 , 71 , 60**Q2 A) Choose the correct answer:**(1) The equation of line of symmetry $F(x) = (X - 2)^2$ is

- a) $X = 0$ b) $X = 2$ c) $X = -2$ d) $X = -4$

(2) If $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = 2$, then $\frac{a}{d} =$

- a) 5×2^2 b) 40 c) 10 d) 2×5^3

(3) If $F(x) = X^2$, $X \in [-2, 2]$, then $F(x) \in$

- a) $[0, 4[$ b) $]0, 4[$ c) $[0, 4]$ d) $[-4, 4[$

B): If $\frac{y}{x-z} = \frac{x}{y} = \frac{x+y}{z}$, prove that each ratio equal 2 ($x+y \neq 0$)Then find $X : Y : Z$: $\frac{2x+y-z}{7} = \frac{y+z}{9}$

Q3

- A)** If $X = \{1, 2, 3, 6, 11\}$ and \mathcal{R} is relation on X where $a \mathcal{R} b$ means " $a + 2b = \text{odd number}$ " for $a, b \in X$:

- ① Write \mathcal{R} and represents it by arrow diagram
 - ② Is \mathcal{R} function or not? Give reason.
-

- B)** If the Positive quantities $3K, 2L, M, 6N$ are in continued proportion, prove that: $\frac{L^3 + K^2}{27N + 4} = \left(\frac{2L^2}{3m}\right)^2$
-

Q4

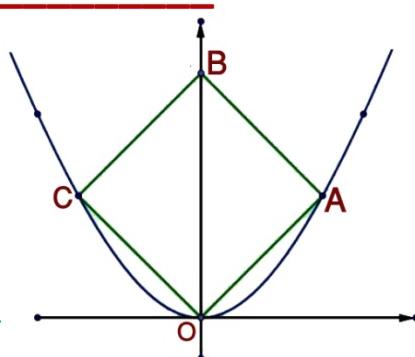
- A)** IF $\mathcal{F}(x) = 2X + K$, $\mathcal{G}(x) = X^2 + K$, and $\mathcal{F}(2) + \mathcal{G}(-4) = 30$,
Find $\mathcal{F}(-2) + \mathcal{G}(2)$
-

- B)** IF $Y = a - 9$, $Y \propto \frac{1}{x^2}$, and $a = 18$ at $X = \frac{3}{2}$, find the relation between X, y then find Y when $X = 1$
-

Q5

- A)** If $\frac{21x-y}{7x-z} = \frac{y}{z}$, prove that $Y \propto Z$
-

- B)** In the opposite figure:
The curve represents $\mathcal{F}(x) = x^2$
OABC is a square
Find the coordinate of A, B, C

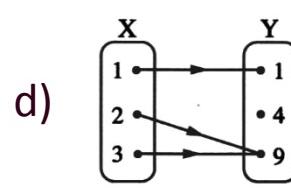
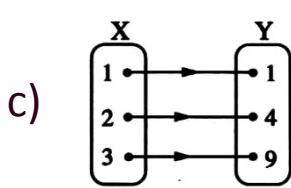
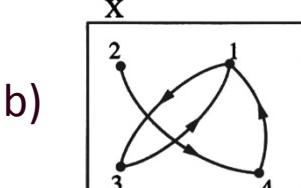
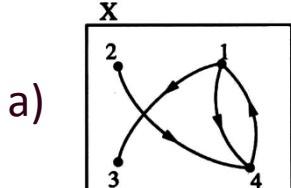


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End of the questions

ALGEBRA – MODEL NO**14****Q1 A) Choose the correct answer:**

(1) Which of the following relations not a function?

(2) If $X = \{3\}$, then X^2

- a) $\{9\}$ b) 9 c) $\{(3, 3)\}$ d) $\{(3, 9)\}$

(3) If $\frac{a}{b} = \frac{2}{3}$, $\frac{a}{c} = \frac{4}{5}$, then $b : c =$

- a) $3 : 4$ b) $5 : 6$ c) $6 : 5$ d) $4 : 3$
-

B): Find the arithmetic mean and the standard deviation for the values $8, 9, 7, 6, 5$ **Q2 A) Choose the correct answer:**(1) If $\mathcal{F}(x - 1) = X + 2$, then $\mathcal{F}(4) = \dots\dots\dots$

- a) 5 b) 6 c) 7 d) 8

(2) If $a, X, b, 2X$ are proportional quantities, then $\frac{a}{b} = \dots\dots\dots$

- a) 2 b) $\frac{1}{2}$ c) $\frac{1}{3}$ d) $\frac{1}{4}$

(3) The relation which represents direct variation between X, Y is ...

- a) $XY = 5$ b) $\frac{x}{5} = \frac{y}{3}$ c) $Y = X + 3$ d) $\frac{x}{5} = \frac{4}{y}$
-

B): If $\frac{x+y}{7} = \frac{y-2z}{5} = \frac{z+x}{4}$, Find the numerical value of $\frac{3x+2y}{x+3y-3z}$

Q3

A) If $X = \{-2, 2, 5\}$, $Y = \{3, 7, K\}$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $b = a^2 - 1$ " for $a \in X, b \in Y$:

- ① Find the value of K
 - ② Represents \mathcal{F} by arrow diagram
-

B) If a, b, c, d are in continued proportion, prove that:

$$\Leftrightarrow \frac{a^2 + d^2}{c(a+c)} = \frac{b}{d} + \frac{d}{b} - 1$$

Q4

A) If the curve of $\mathcal{F}: \mathcal{R} \rightarrow \mathcal{R}$, $\mathcal{F}(x) = m - x^2$ cut X -axis at the point $(-2, b)$. Find the value $m^b + 2m$

B) IF $Y = a + 2$, $a \propto \frac{1}{x}$, and $a = 5$ at $X = 2$, find the relation between X, y then find Y when $X = 1$

Q5

A) If $2a = 3b = 4c$, find the numerical value of $\frac{a^2 + b^2 + c^2}{a(b+c)}$

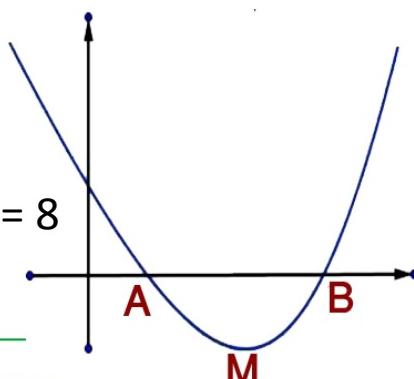
B) In the opposite figure:

The curve of quadratic function $F(x)$

Cuts X -axis in $A(1, 0), B(4, 0)$

M is vertex of the curve and $F(-2) + F(7) = 8$

Find the value of $F(-2)$



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End of the questions

ALGEBRA – MODEL NO**15****Q1 A) Choose the correct answer:**(1) If $(X - Y) \times Y = \{(1,2), (1,3)\}$, and $n(X \times Y) = 6$, then $X = \dots\dots\dots$

- a) {1} b) {1, 2} c) {1, 3, 6} d) {1, 3, 2}
-

(2) If $\mathcal{F}(x) = X - 5$, and $\frac{1}{2} F(a) = 3$, then $a = \dots\dots\dots$

- a) 2 b) 8 c) 11 d) 16
-

(3) If $X \in \mathcal{R}^-$, then the point $(-X, \sqrt[3]{x})$ lies in the quadrant.

- a) First b) Second c) Third d) Fourth
-

B): If $4a^2 + 9b^2 = 12ab$, prove that: $a \propto b$ **Q2 A) Choose the correct answer:**(1) If $\mathcal{F}(x^2) = x + 2$, then $\mathcal{F}(9) = \dots\dots\dots$

- a) 5 b) 7 c) 11 d) 83
-

(2) If $\frac{a}{b} = \frac{2}{3}$, $\frac{a}{c} = \frac{4}{5}$, then $b : c = \dots\dots\dots$

- a) 3 : 4 b) 5 : 6 c) 6 : 5 d) 4 : 3
-

(3) The relation represents inverse variation between Y , X is

- a) $Y = 4X$ b) $\frac{x}{y} = \frac{5}{7}$ c) $\frac{x}{5} = \frac{2}{y}$ d) $Y = X + 5$
-

B): If $\frac{x+y}{3} = \frac{y+z}{8} = \frac{z+x}{6}$,**Prove that:** $\frac{x+y+z}{2x+3y+3z} = \frac{17}{50}$

Q3

A) If $X = \{-3, -2, -1, 0, 1, 2, 3\}$, $Y = [0, 9]$ and \mathcal{R} is a relation from X to Y where $a \mathcal{R} b$ means " $a^2 = b$ " for $a \in X, b \in Y$:

- ① Write \mathcal{R} . ② Is \mathcal{R} is a function or not? Give reason.
-

B) If $\frac{21x+a}{7x+b} = \frac{a}{b}$, $x \neq 0$, find the value of $\frac{a+2b}{2a}$

Q4

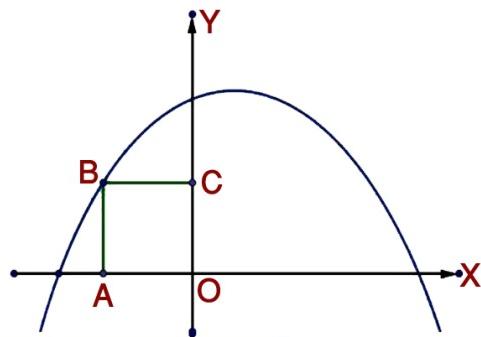
A) In the opposite figure:

The opposite figure represents

$$\text{Curve of } \mathcal{F}(x) = -x^2 - x + 5$$

If OABC is square,

Find its area?



B) IF $Y = K + m$, K is constant, $m \propto X$, and $Y = 3$ at $X = 0$, $Y = 5$ at $X = 3$ find the relation between X , y then Find Y when $X = 7$

Q5

A) If $\mathcal{F}(x) = Kx^2 + (3K+2)x + 6$ and the X-coordinate of the vertex of $\mathcal{F}(x)$ equals 2, Find the value of K then find $\mathcal{F}(1) + \mathcal{F}(-1)$

B) The following table represents the excellent pupils in mathematics in 10 preparatory schools in Dakahlia:

No. of pupils	4	6	8	5	Sum
No. of schools	1	2	3	4	10

☞ Find the arithmetic mean and standard deviation for the number of excellent pupils

◆ ◆ ◆
End of the questions

(1) Cairo

1 Complete each of the following:

- If $\frac{a}{2} = \frac{b}{3} = 5$, then $a + b = \dots$.
- The range of the values 2, 9, 6, 16, and 8 is \dots .
- If 4, 6, and x are in proportion, then $x = \dots$.
- The point (1, -1) lies on \dots Quadrant.
- The positive square root of the average of squares deviations of values from the mean is called \dots .
- If $\frac{a}{\sqrt{3}-\sqrt{2}} = \frac{b}{\sqrt{3}-\sqrt{2}} = 1$, then $a - b = \dots$.

2 Choose the correct answer:

- If $X \times Y = \{(1, 3), (1, 4)\}$ then $n(X) = \dots$. (1, 2, 3, 4)
- In the opposite figures, if R is a function on $X = \{1, 2, 3\}$ of range = {1}, then the graph that represent it is \dots .

a)

b)

c)

d)
- If $f(x) = 4x + b$, $f(3) = 15$ then $b = \dots$. (156, 3, 4, -3)
- If $\frac{y}{x} = 5$, then $y \propto \dots$. ($x, \frac{1}{x}, x^5, \frac{1}{x^5}$)
- If $\frac{a}{b} = \frac{c}{d} = \frac{3}{4}$, then $\frac{a+c}{b+d} = \dots$. ($\frac{3}{4}, \frac{7}{4}, \frac{3}{7}, \frac{9}{16}$)
- Which of the following relations represents an inverse variation between the two variables x and y ? ($y = \frac{x}{7}, xy = 7, y = 7x, y = \frac{7}{x}$)

- 3** a) If $x = \{1, 2, 3\}$, $y = \{1, 3, 6, 9, 12\}$ and R is a relation from x to y where a R b means " $a = \frac{1}{3}b$ " for all $a \in x$, $b \in y$. Write R and prove that R is a function and write its range.

- b) If $y \propto x$, $y = 6$ when $x = 3$, then find the relation between x and y .

- 4** a) Draw the function f where $f(x) = x(6-x) + 4$, $x \in [-1, 7]$

- b) If b is the middle proportional between a and c , then prove that: $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

5 a) If $\frac{a}{2} = \frac{b}{5} = \frac{2a+b}{3x}$, then find the value of x.

b) Calculate the mean of the values : 2, 3, 6, 8, and 11 , then deduce their standard deviation.

(2) Giza

1 Complete the following:

a) If $n(X) = 5$, $n(X \times Y) = 15$ then $n(Y) = \dots$.

b) If $a = \sqrt{3}$, $b = \sqrt{2}$ then the value of $a^4 - b^4 = \dots$.

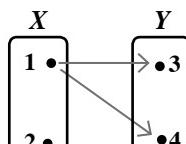
c) If $F : R \rightarrow R$, $f(x) = 3x$ represented by a straight line passing through (-4 ,)

d) If $X = \{2, 3\}$ then $X^2 = \dots$ e) If $y = 3x$ then $y \propto \dots$.

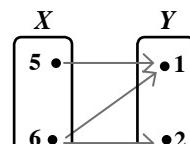
f) The range for the set 12 , 15 , 19 , 25 and 30 equals

2 Choose the correct answer:

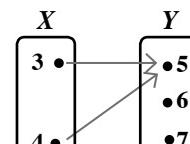
1) The diagram that represents a function is



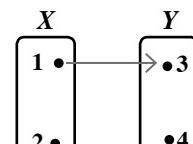
(a)



(b)



(c)



(d)

2) If $f(x) = x^3$, then $f(2) + f(-2) = \dots$.

- a) 0 b) 2 c) 3 d) 8

3) The middle proportion between the two numbers 4 and 36 =

- a) 32 b) 40 c) 12 d) ± 12

4) If $\frac{x}{3} = \frac{8}{12}$ then $x = \dots$.

- a) 6 b) 5 c) 4 d) 2

5) The mean for the values 3, 4, 6 and 7 equals

- a) 5 b) 10 c) 20 d) 40

6) If $\frac{x}{y} = \frac{2}{3}$ then $\frac{3x}{5y} = \dots$.

- a) $\frac{2}{3}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{5}{8}$

3 a) If $x = \{2, 3, 4, 7\}$, $y = \{1, 2, 3, 4, 7, 8\}$ and R is a relation from x to y where a R b means that “a - b is a prime number” for all $a \in X$, $b \in Y$. Write R, represent it by an arrow diagram.

b) If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$

Find: 1) The relation between x and y 2) The value of y when $x = 1.5$

4 a) Find the number that if subtracted thrice from the two terms of ratio $\frac{49}{69}$ the ratio becomes $\frac{2}{3}$.

b) Draw the function $f(x) = 4 - x^2$ where $x \in [-3, 3]$ then find:

- i) max. point of $f(x)$ ii) equation of axis of symmetry.

5 a) If a, b, c and d are proportional. **Prove that:** $\frac{a-b}{b} = \frac{c-d}{d}$

b) The following frequency distribution shows the marks of 40 students in an exam:

Sets	0 -	4 -	8 -	12 -	16 - 20	Total
Frequency	2	5	8	15	10	40

Find: The standard deviation for this distribution.

(3) Alexandria

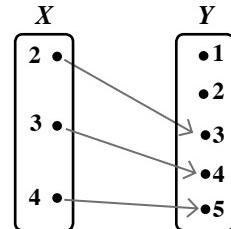
1 Choose the correct answer:

a) The middle proportional between 3, 27 is (-9 or 9 or ± 9 or 21)

b) **In the opposite function:**

Represents a function from X $\not\rightarrow$ Y, then its range is

({2, 3, 4} or {2, 3, 5} or {3, 4, 5} or Y)



c) If y varies inversely with x and $x = \sqrt{3}$ when $y = \frac{2}{\sqrt{3}}$ then the constant of proportion equals

($\frac{1}{2}$ or $\frac{2}{3}$ or 2 or 6)

d) The most repeated value in a set of values represents is

(median or rang or mode or mean)

e) If $f(x) = 5x + 4$ represented by a straight line passing through (3, b) then $b =$ (5 or 4 or 3 or 9)

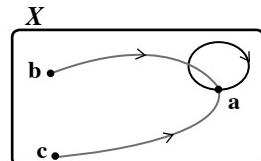
f) If $2a = 3b$ then $\frac{5b}{a} =$ ($\frac{5}{3}$ or $\frac{5}{2}$ or $\frac{15}{2}$ or $\frac{10}{3}$)

2 Complete:

a) In the opposite figure:

Represents a function on X, its range =

- 1) {a} 2) {a, b, c}
3) {a, b} 4) {b, c}



- b) The range for the values 7, 4 , 9 , 5 and 13 is
- c) The function f where $f(x) = -3$, intersects Y-axis in the point (..... ,) .
- d) If $\frac{a}{b} = \frac{3}{2}$ then $\frac{a+b}{a-b} = \dots$.
- e) The relation between the distance and time at uniform velocity is called variation.
- f) If $(x+5 , 8) = (1 , 64+x)$ then $y = \dots$.
- 3** a) If the straight line which represents $F : R \rightarrow R$ where $f(x) = 6x - a$ cut y-axis at $(b, 3)$ find a, b
- b) If b is a middle proportional of a and c prove that $\frac{a^3 + b^3}{b^3 + c^3} = \frac{a^2}{bc}$
- 4** a) Find the number which if added to the two terms of ratio $7 : 11$ it will be $2:3$
- b) If $x = \{0 , 1 , 2 , 3 , 4 , 5 , 6\}$, R is a relation on x such that $a R b$ means “ a twice b ” for all $a, b \in x$, $a \neq b$.
- 5** a) If $x = L + 9$ and $L \propto y$ then find the relation between x and y know that $x = 24$, when $y = 5$, then find the value of y when $x = 12$.
- b) Calculate the standard deviation for the values : 12 , 13 , 16 , 18 , 21.

(4) Al Menofia

1 Choose the correct answer:

- a) If $n(x^2) = 9$ then $n(x) = \dots$. $(1 , 2 , 3 , 4)$
- b) The range of values 1 , 5 , 12 , 10 , 9 and 5 is $(5 \text{ or } 7 \text{ or } 10 \text{ or } 11)$
- c) If $\frac{a}{b} = \frac{b}{c} = \frac{c}{5} = 2$ then the value of $a = \dots$.
 $(5 \times 2^2 \text{ or } 40 \text{ or } 10 \text{ or } 2 \times 5^3)$
- d) If $yx^2 = 5$ then y changes inversely with $= \dots$. $(\frac{1}{x^2} \text{ or } \frac{1}{x} \text{ or } x \text{ or } x^2)$
- e) If $f(x) = 6x$, then $f(2) + f(-2) = \dots$. $(0 , 1 , 12 , 24)$
- f) If $5a , 2 , 3 b$ and 7 are proportional quantities when $\frac{a}{b} = \dots$.
 $(\frac{3}{7} \text{ or } \frac{6}{35} \text{ or } \frac{3}{5} \text{ or } \frac{3}{2})$

2 Complete the following:

- a) If the standard deviation of a set of values equal zero then
- b) If $f(x) = 5x - 7$ then $f(3) = \dots$
- c) If $y \propto x$ and $y = 8$ when $x = 2$ so $y = \dots$ when $x = 3$

d) If $x \in R^+$ and $(x^2 + 3)(x + \sqrt{3})(x - \sqrt{3}) = 7$ then $x = \dots$

e) If $\frac{x}{y} = \frac{3}{5}$ then $\frac{5x}{3y} = \dots$

f) If $(5, x-7) = (y+1, -5)$. Then $x+y = \dots$

3 a) If a, b, c and d are proportional quantities, **Prove that:** $\frac{d}{c+d} = \frac{b}{a+b}$

b) Graph $f(x) = -x^2 + 1$, $x \in [-3, 3]$

4 a) If $y \propto \frac{1}{x}$, $y = 6$ at $x = 3$

1) **Find:** the relation between x, y

2) **Find:** y at $x = 2$

b) If $x = \{1, 3, 5\}$ and R is a function on x where $R = \{a, 3\}, (b, 1), (1, 5)\}$ then find $a+b$. **Find** the value of: $\frac{x^3 - y^3}{x - y}$

5 a) If b is a middle proportional between a and c .

Prove that: $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

b) The following frequency distribution shows the number of goals scored in 30 matches.

Number of goals	zero	1	2	3	4	5
Number of matches	1	4	5	9	6	5

Find the mean and the standard deviation for the number of goals.

(5) Al Gharbia

1 Complete the following:

a) The point $(-1, 1)$ lies on the quadrant.

b) If $n(X) = 3$, $n(X \times Y) = 12$, then $n(Y) = \dots$

c) If $ad = bc$ then $\frac{a}{c} = \dots$

d) The middle proportional between 4 and 9 =

e) The range for the values 7, 4, 9, 5, 13 is

f) If $xy = 5$ then $y \propto \dots$

2 Choose the correct answer from those between brackets:

a) If $x \times y = \{(1, 3), (1, 4)\}$ then $n(x) = \dots$ (1, 2, 3, 4)

b) If $X = \{3, 4\}$, $Y = \{5, 6, 2\}$, then $(6, 4) \in \dots$ ($X \times Y$, $Y \times X$, X^2 , Y^2)

c) The fourth proportional for the numbers 2, 6, 9 is

(12 or 18 or 27 or 54)

d) If $y \propto x$ and $y = 6$ at $x = 2$ then $y = \dots$ when $x = 3$.

(6 or 9 or 12 or 18)

e) The mean for 30, 20, 50, 60 is (25 or 40 or 50 or 55)

f) If $\frac{a}{b} = \frac{3}{2}$ then $\frac{a-b}{a+b} = 2$ then the value of $a = \dots$.

($\frac{3}{2}$ or 5 or $\frac{1}{5}$ or $\frac{2}{3}$)

3 a) Two integer numbers, the ratio between them is 3:7 and if subtracted 5 from each term, the ratio between each of them becomes 1:3. Find the two numbers.

b) If $x = \{2, 4, 8\}$, $y = \{4, 6, 12, 24\}$ and R is a relation from $x \rightarrow y$. Where aRb means $b > 2a$ for all $a \in x, b \in y$ write R , represent it by an arrow diagram, Cartesian diagram.

4 a) If a, b, c and d are four proportional quantities. Prove that $\frac{ac}{bd} = \left(\frac{a-c}{b-d}\right)^2$

b) If $y \propto \frac{1}{x}$ and $y = 2$ when $x = 4$.

Find: 1) The relation between x and y . 2) The value of y when $x = 16$.

5 a) Draw the function $f(x) = 2 - x^2$ where $x \in [-3, 3]$ then find:

i) max. point of f ii) equation of the axis of symmetry.

b) Calculate the standard deviation for the values: 6, 7, 8, 9 and 10.

(6) Al Dakahlia

1 Complete the following:

a) If $Y \propto X$ and $Y = 6$ when $X = 4$ then $\frac{Y}{X} = \dots$.

b) The linear function $y = 2x - 1$ represented by a straight line cut y-axis at

c) The arithmetic mean of the values 4, 13, 18, 25, 30 is

d) If $\frac{a}{b} = \frac{7}{4}$ then $\frac{4a}{b} = \dots$.

e) One third the number 3^{18} in the form a^n is

f) If 1, x , 9, y are in continued proportion then $x = \dots$, $y = \dots$, where x, y are +ve.

2 Choose the correct answer:

1) Biggest value - smallest value for a given data is

a) Median b) Range c) Mode d) Standard deviation

2) If $\frac{a}{5} = \frac{b}{2} = \frac{a-2b}{k}$ then $k = \dots$.

a) 5 b) 2 c) 3 d) 1

3) If $n(x^2) = 9$ then $n(x) = \dots$

a) 3

b) 6

c) 18

d) 81

4) If $1 + 4x^2y^2 = 4 \times y$ then \dots

a) $y \propto \sqrt{x}$

b) $y \propto \frac{1}{x}$

c) $y \propto x$

d) $y \propto \frac{1}{x^2}$

5) The value of x which satisfies the equation $2^x + 2^{x+1} = \frac{2}{3}$ is \dots

a) 1

b) zero

c) -1

d) 2

6) If the function $f(x) = 6$, then $\frac{f(3)}{f(a)} = \dots$

3) a) If $\frac{x+y}{5} = \frac{y+z}{3} = \frac{x+z}{6}$ prove that: $\frac{x-z}{2} = \frac{x+y+z}{7}$

b) If $x = z + 8$ and $z \propto \frac{1}{y}$ and it $z = 2$ when $y = 3$, Find y at $x = 3$

4) a) If $x = \{0, 1, 2, 3, 4, 5, 6\}$, $y = R$ is a relation on x such that $a R b$ means "a twice b" all $a, b \in x$, $a \neq b$.

i) Write R , represent it by an arrow diagram.

ii) Is $(0,0) \in R$?

iii) Is $2 R 4$?

iv) find x if $6 R x$

b) If a, b, c, d are in continued proportion prove that: $\frac{ab - dc}{b^2 - c^2} = \frac{a+c}{b}$

5) a) Draw the function $f(x) = x(6-x) + 4$ on the interval $[-1, -7]$

b) The following table shows the number of goals scored in football matches.

Number of goals	zero	1	2	3	4	5	6
Number of matches	1	4	6	9	5	3	2

calculate the standard deviation of number of goals.

(7) Behera

1 Choose the correct answer:

1) In the opposite figure:

The Cartesian diagram of a function on X ,

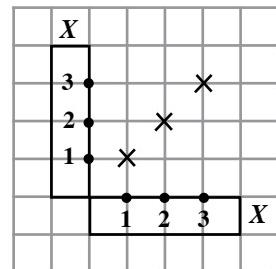
then its range = \dots

a) $\{1, 2, 3\}$

b) $\{2, 1\}$

c) X

d) $\{3\}$



2) The function $y = x + 3$ represented by a straight line cut x-axis at \dots

a) -3

b) -2

c) 0

d) 3

- 3) If $x = \{5\}$, $y = \{3\}$ then $n(x \times y) = \dots$.
 a) 15 b) 8 c) 2 d) 1
- 4) The fourth proportional for the numbers 8, 6 and 4 is \dots .
 a) 2 b) 3 c) 4 d) 7
- 5) The range for the values 7, 4, 9, 5 and 13 is \dots .
 a) 6 b) 7 c) 9 d) 5
- 6) If $\frac{a}{b} = \frac{5}{4}$ then $\frac{a+b}{a-b} = \dots$.
 a) $\frac{5}{4}$ b) 9 c) $\frac{4}{5}$ d) 2

2 Complete the following:

- a) If $f(x) = 3x + b$, $f(4) = 13$ then $b = \dots$.
- b) If $x + \frac{1}{x} = 2$ where $x \neq 0$, then $x^2 + \frac{1}{x^2} = \dots$.
- c) The quantities a, b and c are said to be in continued proportional if $\frac{a}{b} = \dots$
- d) If $y \propto x$ and $y = 6$ at $x = 2$ then $y = \dots$ when $x = 12$
- e) The positive square root to the average of squares deviations of values from the mean is called \dots .
- f) The proportion is the equality of \dots .

- 3) a) If $x = \{1, 2, 4\}$ and R is relation on x where $a R b$ means "a is a multiple of b" for all $a, b \in x$. Write R, represent it by an arrow diagram. Is R a function.
 b) If b is a middle proportional between a and c

Prove that:
$$\frac{a^3 + b^3}{b^3 + c^3} = \frac{a^2}{bc}$$

- 4) a) If $\frac{x}{y} = \frac{3}{5}$ find the value of the ratio: $\frac{3x-y}{5y-2x}$
 b) If $Y \propto \frac{1}{X}$ and $Y = 5$ when $X = 15$

First: Find the relation between X and Y

Second: Find the value of X when Y = 10

- 5) a) If 5, 6, 7, 8 and 9 represent the marks of a pupil in mathematics test in 5 months.
Find the mean and the standard deviation.
- b) Draw the function $f(x) = 1 - x^2$ where $x \in [-3, 3]$ then find:
 i) max. point of $f(x)$ ii) equation of the axis of symmetry.

(8) Damietta

1 Choose the correct answer from the given answers:

1. If $f(x) = 2x$ represented by a straight line passing through $(-3, \dots)$
a) -6 b) -5 c) -3 d) 2
2. The point $(-2, 1)$ lies on the quadrant
a) 1st b) 2nd c) 3rd d) 4th
3. The point $(3, 0)$ lies on axis
a) 0 b) 1 c) 2 d) 3
4. If $x + \frac{1}{x} = 2$ then $x^2 + \frac{1}{x^2} = \dots$.
a) 4 b) 2 c) zero d) 5
5. If $\sum (x - \bar{x})^2 = 144$ for set of values whose number is 9 then $\sigma = \dots$.
a) 16 b) 4 c) 12 d) 9
6. If $x : y = 3 : 2$, $y : z = 4 : 5$ then $x : y : z = \dots$.
a) $2 : 4 : 5$ b) $6 : 4 : 5$ c) $4 : 6 : 5$ d) $10 : 12 : 15$

2 Complete to make the following statements correct:

- a) The proportion is
- b) The most accurate measure of the dispersions is
- c) The middle proportional between the two numbers 4, 9 equals
- d) If $3a - 2b = \text{zero}$ then $\frac{a}{b} = \dots$.
- e) If $f(x) = x^2 + 7$ then $f(3) = \dots$.
- f) If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 20$ then $x = 12$ when $y = \dots$.

3 a) If $x = \{2, 4, 8\}$, $y = \{4, 6, 12, 24\}$ and R is a relation from $x \rightarrow y$ where aRb means $b > 2a$ for all $a \in x, b \in y$ write R, represent it by an arrow diagram, Cartesian diagram.

Then find the value of the result when $x = 1$.

b) If $2a = 5b$ find the value of: $\frac{8a^2 - ab}{4ab + 5b^2}$

4 a) Draw the function $f(x) = x^2 - 4$ where $x \in [-3, 3]$ then find:

- i) max. point. ii) equation of the axis of symmetry.
- b) If $y \propto x$ and $y = 14$ when $x = 42$ Find:
 - 1) The relation between y and x.
 - 2) Value of y when $x = 20$

5 a) If $\frac{a}{4x+y} = \frac{b}{x-4y}$ prove that: $\frac{a+b}{5x-3y} = \frac{a-b}{3x+5y}$

b) The following table shows frequency distribution of the number of goals scored by 100 players in five penalties:

Number of goals	zero	1	2	3	4	5	Total
Number of players	3	16	17	25	20	19	100

Calculate the mean and the standard deviation to the number of recorded goals.

(9) Port Said

1 Complete the following:

a) From the data of the following table:

X	3	5	6	10
Y	10	6	5	3

The kind of variation between y and x is

b) The point (0 , 4) lies on axis.

c) If the mean of the values: 10, x, 18 , 12 equal 15 then x =

d) If $y \propto x$ then $y = \dots$.

e) Resources of collecting data are ,

f) The middle proportional between 2 , 18 , is

2 Choose the correct answer:

1) If $x y = \{(1,3) , (1,4)\}$ then $n(x) = \dots$.

- a) 1 b) 2 c) 3 d) 4

2) If $(2, b) \in f$ where $f(x) = 3x - 6$ then $b = \dots$.

- a) 0 b) 2 c) 7 d) 9

3) If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a-b+c}{x}$ then $x = \dots$.

- a) 9 b) 8 c) 7 d) 5

4) If $a = \sqrt{5}$, $b = \sqrt{7}$ then $a^4 \times b^{-4} = \dots$.

- a) $\frac{7}{5}$ b) $\frac{5}{7}$ c) $\frac{25}{49}$ d) $\frac{49}{25}$

5) If $(x-5 , 7-x)$ lies on the 2nd quadrant then $x = \dots$.

- a) 3 b) 5 c) 7 d) 9

6) If $y \propto \sqrt{x}$ and $y = 5$ when $x = 9$ then $y = \dots$.

- a) $5x$ b) $\frac{5}{3}x$ c) $3x$ d) $\frac{3}{5}x$

3 a) Represent graphically the function $f(x) = (x-3)^2$ where $x \in [0, 6]$ and from the graph find the vertex point and max. and minimum point at the function.

b) If $\frac{a+b}{3} = \frac{2b+c}{6}$ = prove that : $c \propto a$

4 a) If $x = \{1, 2, 5, 7\}$, $y = \{2, 3, 7, 8\}$ and R is a relation from x to y where $a R b$ means “ $a+b$ is an odd number” for all $a \in x$, $b \in y$ write R and represent it by an arrow diagram.

b) If a, b, c and d are four real proportional quantities. Then prove that:

$$\frac{ac}{bd} \left(\frac{a-c}{b-d} \right)^2$$

5 a) If y changes inversely with x and $y = 2$ when $x = 4$ then

Find the value of y when $x = 16$

b) The following frequency distribution shows the ages of 20 children.

Ages in year	2	4	6	8	10	Total
Number of children	3	4	7	5	1	20

Calculate: The standard deviation to ages in years.

(10) Suez

1 A) Complete:

1. The point $(5, -3)$ lies on the quadrant.

2. If $x = \{5, 6, 7\}$ then $n(x^2) = \dots$

3. If $y \propto x^2$ then $\frac{y_1}{y_2} = \dots$.

B) If $x = \{0, 1, 2, 3, 4, 5, 6\}$, R is a relation on x such than $a R b$ means “ a twice b ” for all $a, b \in x$, $a \neq b$, then $R = \dots$

2 A) Complete:

1. The middle proportion for the values 1 and 4 equals

2. The mean for the values 4, 3, 2, 5, 1 is

3. If $f(x) = 5x - 7$ then $f(3) = \dots$.

B) If $\frac{x}{y} = \frac{2}{3}$ Find the value of the ratio $\frac{6x - 2y}{y - x}$.



3 (A) Choose the correct answer:

1. If $f(x) = x^3$ then $f(2) + f(-2) = \dots$. (zero or $\frac{1}{2}$ or 1 or 2)

2. The range for the values 2, 13, 12, 16 and 14 is (2 or 13 or 14 or 16)

3. If $(2, -6) \in f$ where $f(x) = kx$, then $k = \dots$ (-1 or -2 or -3 or 3)

B) Represent graphically $f(x) = 2-x$

4 (A) Choose the correct answer from the given answers:

1. If $f(x) = 5x - 7$ then $f(3) = \dots$. (1, 5, 7, 8)

2. If $\frac{A}{B} = \frac{3}{4}$ then $4A - 3B + 5 = \dots$. (0 or 1 or 3 or 5)

3. If $y = \frac{-3}{x}$ then ($y = x$ or $y \propto x$ or $y \propto \frac{1}{x}$ or $yx = 0$)

b) If a, b, c and d are continued proportional. Prove that $\frac{a+c}{b+d} = \frac{b}{c}$

5 a) If $Y \propto \frac{1}{X}$ and $Y = 1$ when $X = 2$.

Find: 1) The relation between X and Y. 2) The value of X when $Y = 4$.

b) The following distribution for the marks of some students in one of the exams:

Marks	0	1	2	3
Number of students	1	2	3	4

Find: 1) The mean. 2) The standard deviation for the marks of the students.

(11) Al Fayoum

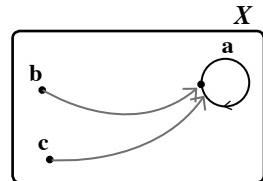
1 Choose the correct answer between brackets:

a) In the opposite figure:

The range of the function =

- a) {a}
- b) {a, b}
- c) {a, b, c}
- d) {b, c}

b) The point $(7, -9)$ lies on the quadrant. (1st, 2nd, 3rd, 4th)



c) If $f(x) = x^7 - 3x^2$, then its degree =

d) The positive middle proportional between the two numbers 2, 8 equals (6 or 4 or -4 or 16)

e) If $\frac{x}{5} = \frac{y}{7}$ then the expression $7x - 5y + 9 = \dots$. (4 or 7 or 9 or $\frac{5}{7}$)

f) From the secondary resources to collect data is the

(interview or questionnaires or personnel database or observation and measurement)

2 Complete each of the following to get correct statements:

a) The difference between the greatest value and the smallest value the set is called

b) The fourth proportional of the numbers 4 , 3 , 8 is

c) If $\frac{5a - 7b}{8a + 11b} = \text{zero}$ then $\frac{b}{a} = \dots$.

d) If $y \propto x$ and $y = 2$ when $x = 8$ then $y = \dots$ when $x = 12$.

e) The point (3 , 0) lies on axis.

f) If $f(x) = ax + b$, $f(y) = 13$ then $b = \dots$.

3 a) Graph $f(x) = x^2 - 6x + 9$, $x \in [0, 6]$.

b) If $\frac{x+y}{7} = \frac{x+z}{5} = \frac{z+x}{8}$ Prove that $\frac{x+y+z}{x-z} = 5$

4 a) If b is a middle proportional between a , c Prove that: $\frac{c}{a} = \frac{c^2}{b^2}$

b) If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$ Find:

1) The relation between x , y. 2) The value of y when $x = 1\frac{1}{2}$

5 a) If $x = \{1 , 3 , 4 , 5\}$, $y = \{1 , 9 , 3 , 4 , 5 , 6\}$ and R is a relation from x to y where a R b means “ $a + b = 7$ ” for every $a \in x$, $b \in y$ write R and represent it by an arrow diagram and Cartesian diagram. Is R a function? Why?

b) The following is a frequency distribution which shows the number of children of some families in one of the new cities

Number of children	zero	1	2	3	4	Total
Number of families	5	7	7	5	6	30

Calculate the mean and the standard of the number of children

(12) Aswan

1 Choose the correct answer from the given ones:

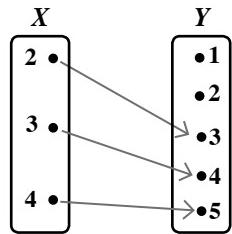
1) The difference between the greatest value and the smallest value in the set called

- a) median b) the range c) mode d) mean

2) In the opposite function:

Represents a function from X $\not\subseteq$ Y, then its range is

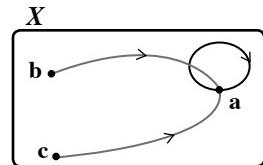
- a) {2, 3, 4}
- b) {2, 3, 5}
- c) {3, 4, 5}
- d) Y



3) In the opposite figure:

Represents a function on X, its range =

- a) {a}
- b) {a, b, c}
- c) {a, b}
- d) {b, c}



4) Which relation represents the inverse variation between y and x

- a) $y = 5x + 1$
- b) $y = \frac{1}{2}x$
- c) $xy = 7$
- d) $\frac{x}{y} = \frac{2}{3}$

5) The mean for the values 2, 5, 7 and 10 is

- a) 2
- b) 8
- c) 4
- d) 6

2 Complete the following statements:

1) If $y = 2x$, then $y \propto$

2) If the function $f : f(x) = -2$, then $f(x+2) =$

3) If $5a = 7b$, then $\frac{b}{a} =$

4) If 2, x, 4, 6 are proportional quantities, then $x =$

5) The value of the expression $2^{\text{zero}} + 2^{-1} - \left(\frac{-1}{\sqrt{2}}\right)^2 =$

6) If $\frac{a}{3} = \frac{b}{5} = \frac{a+b}{2x}$, then $x =$

3 a) Graph $f(x) = x^2 - 2x$, $x \in [-1, 3]$.

b) The point $(-1, -1)$ is located in the quadrant.

- a) first
- b) second
- c) third
- d) fourth

4 a) First

x	3	5	4
y	20	12	15

1) From the opposite table write the type of variation that data represents between y and x.

2) Write the relation between y and x.

b) Find x when $y = 40$

5 a) First: If $y \propto x$ and $y = 6$ when $x = 2$, find the value of y when $x = 5$

Second: Calculate the standard deviation of the following values 12, 14, 16 and 18.

b) Find the two numbers which the ratio between them equals 7 : 12, and one of them is more than the other by 275.

(13) Kafr El-Sheikh

1 Choose the correct answer:

1) The middle proportional between $3 b$, $12 a^2 b$ is ($-6a$, $\pm 6b$, $\pm 6ab$, ab)

2) If $\frac{a}{b} = \frac{2}{5}$, then $\frac{a-b}{a+b} = \dots$ ($\frac{3}{7}, \frac{-3}{7}, \frac{7}{3}, \frac{-7}{3}$)

3) The range of the set of values: 8, 3, 5, 12, 10 is (7, 8, 9, 10)

4) If the point (3, a) lies on the X-axis then $a = \dots$ (-3, 3, zero, 2)

5) The fourth proportional of the numbers 2, 5, 8 is (20, 22, 25, 30)

6) If y varies inversely with \sqrt{x} and $y = 3$ when $x = 16$,

Then the constant of variation= ($\frac{4}{3}, \frac{3}{4}, -12, 12$)

2 Complete:

1) If : $f(x) = x^3 - (5 + x^3)$ of degree.

2) If a weight of a body on the earth (R) directly changes with its weight on the moon (W). If $R_1 = 182$ kg, $W_1 = 35$ kg, then find W_2 when $R_2 = 312$ kg.

3) If 15 workers need 16 days to finish a certain job. How many workers are needed to finish the same job in 12 days?

4) A car moves with a uniform velocity, where the covered distance varies directly with the time. If the car covers a distance 120 km in 5 hr. Find the distance covered by that car in 8 hr.

5) If Y varies directly as x and inversely as z , then $y \propto \dots$.

6) $f(x) = x^2 - 10x + 25$, then $f(4) - f(6) = \dots$

7) If the mean of numbers: $3a - 3, 3a - 1, 2a + 1, 2a + 3, 2a - 6$ is 6 then $a = \dots$

8) If $x^2 - 4xy + 4y^2 = 0$, then $y \propto \dots$.

3 If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4}$, find the value of $\frac{2a - b + 5c}{3b - a}$

4 a) If: $Y \propto \frac{1}{x}$, where $y = 2$ when $x = 3$

Find the relation between y and x , then find the value of y when $x = 12$

b) Graph $f(x) = -x^2$, $x \in [-2, 2]$

5 a) If the number of hours (y) is proportionally inverse with the number of workers (x), and 66 workers fulfilled the work in 4 hours. What is the time needed for 8 workers to fulfill this work?

b) **Find** the standard deviation (show steps)

Degree	5	8	9	10	12	Total
Frequency	1	2	3	3	1	10

Answer the following questions : (calculators is allowed)[Q1] Choose the correct answer from those given:1- If $n(X) = 3$, $n(X \times Y) = 21$ then $n(Y) = \text{_____}$

- (a) 5 (b) 7 (c) 21 (d) 3

2- If $8^{x-9} = 1$, then $X = \text{_____}$ 

- (a) 8 (b) zero (c) 9 (d) 1

3- If $XY = 4$, then $Y \propto \text{_____}$

- (a)
- $X - 4$
- (b)
- X
- (c)
- $\frac{1}{X}$
- (d)
- $X + 4$

4-The solution set of the equation $X^2 + 9 = 0$ in R is--

- (a) { 3 } (b) { -3 } (c) { -3, 3 } (d) Ø

5- The range of the set of the values 6,5,9,13,10 is --

- (a) 8 (b) 5 (c) 9 (d) 10

6- If $\frac{2X}{5} = 6$ then $3X = \text{_____}$

- (a) 30 (b) 45 (c) 12 (d) 15

[Q2]

A) If $X = \{2, 5, 7\}$, $Y = \{1, 3, 6, 11\}$ and R is
a relation from X to Y Where " $a R b$ " means
" $a + b = 8$ " for each $a \in X, b \in Y$.

1. Write R and represent it by an arrow diagram.
2. Show that R is a function and find its range.



B) If $\frac{X}{Y} = \frac{4}{3}$, Find the value of : $\frac{3X + 2Y}{6Y - X}$

In the simplest form .

[Q3]

A) If $Y \propto X$ and $Y = 16$ when $X = 4$, Find:

1) The relation between Y and X

2) Find the value of Y where X = 5

B) If b is the middle proportion between a and c

prove that $\frac{a-b}{b} = \frac{a-c}{b+c}$

[Q4]

A) If $(X+5, 7) = (8, Y+3)$

Find the value of $\sqrt{x^2 + y^2}$

B) If $3, b, 12$ are three positive proportional quantities .

Find the value of $4b+1$

[Q5]

A) Represent graphically the function F where

$F(X) = X^2 - 3$ taking $X \in [-3, 3]$, from the graph deduce:-

1- The coordinates of the vertex of the curve.

2- The minimum value of the function and
The equation of the axis of symmetry

B) Find the standard deviation for the
values $8, 9, 7, 6, 5$

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QUESTION 1:

Choose the correct answer from those given answers :

✓ ① $\sqrt{36} + \sqrt{16} = \dots\dots\dots$

- a) 10 b) 24 c) 52 d) 100

✓ ② The middle proportional between 3 , 27 is
X

- a) 9 b) -9 c) ± 9 d) 1

✓ ③ If $f(x) = 2$ then $f(2) + f(-2) = \dots\dots\dots$

- a) zero b) 4 c) -4 d) 1

✓ ④ The positive number which twice its square = 50 is

- a) 5 b) 10 c) 25 d) 100

✓ ⑤ If $x + y = x y = 5$, then $x^2 y + y^2 x = \dots\dots\dots$

- a) 10 b) 15 c) 20 d) 25

✓ ⑥ The simplest and easiest method of measuring dispersion is

- a) the range b) the standard deviation
c) the arithmetic mean d) the mode

QUESTION 2: $\frac{2}{2} = 4$ $2 \times 5 = 10$
 $\frac{2}{2} = 6$

[A] If $X = \{ 2, 3, 5 \}$, $Y = \{ 4, 6, 8, 10 \}$ and R is a relation from X to Y where
" aRb " means " $2a = b$ " for all $a \in X, b \in Y$.

✓ (1) Write R and represent it by an arrow diagram .

✓ (2) Is the relation R represents a function ? Why ? and If it's a function find
its range .

✓ [B] The ratio between two Integers is 3:7 , If 5 is subtracted from each of
them , then the ratio becomes 1:3 , Find the two numbers .

QUESTION 3:

[A] As Yousef was reading a book , He found out after 3 hours 50 pages remained , after 6 hours 20 pages remained .

If there was a relation between time (t) and the number of pages (Y) .

Is a linear relation

① Represents the relation between (t) , (Y) , Then find the algebraic relation between them .

✓ ② How much time did Yousef takes to finish reading the book ?

✓ ③ How many pages left when Yousef started reading ?

[B] If x , y , z and L are proportional quantities

$$\text{Prove that : } \frac{y-x}{x} = \frac{L-z}{z}$$

$$30 + 30 + 20 \\ \frac{30}{z} = \frac{z}{z} \\ \frac{z}{z} = \frac{y-y_m}{y_m} = \frac{z_m-z}{z}$$

QUESTION 4:

[A] If $y \propto x$ and $y = 40$ at $x = 14$

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Find the relation between x and y , then Find the value of x when $y = 80$?

✓ [B] If $X \times Y = \{(1,2), (1,3), (2,2), (2,3)\}$

Find : ① $X \cup Y$ ② $n(Y^2)$

QUESTION 5:

[A] Represent graphically the function f :

$$f(x) = (x-2)^2 , \text{Taking } x \in [-1, 5]$$

And from the graph Find :

✓ ① The coordinates of the vertex of the curve .

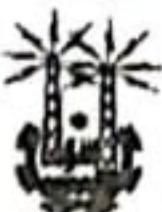
✓ ② The equation of the line of symmetry .

✓ ③ The maximum or the minimum value of the function .

[B] Find the standard deviation for the following set of values :

$$13, 14, 17, 19, 22$$

إنتهت الأسئلة



جبر وإحصاء باللغة الإنجليزية
مدارس اللغات الرسمية والخاصة

امتحان الشهادة الإعدادية العامة
الفصل الدراسي الأول ٢٠١٩ / ٢٠٢٠ م

تنبيه : أسئلة هذا الامتحان في صفحتين - يسمح باستخدام الآلة الحاسبة .

Answer the following questions :

First question : Choose the correct answer :

- 1) If $n(x^2) = 9$, $n(x \times y) = 6$ then $n(y) = \dots$
(2 , 3 , 4 , 6)
- 2) If $xy = 3$ then $y \propto \dots$
($3x$, $\frac{3}{x}$, $\frac{1}{x}$, $\frac{x}{3}$)
- 3) $[2, 5] - \{2, 5\} = \dots$
($[1, 6]$, \emptyset , $]2, 5[$, $\{0\}$)
- 4) $\sqrt{50} - \sqrt{8} = \dots$
($\sqrt{200}$, $\sqrt{98}$, $\sqrt{42}$, $\sqrt{18}$)
- 5) If $\sum(x - \bar{x})^2 = 48$ of a set of values and the number of these value = 12
then $\sigma = \dots$
(-2 , 2 , 4 , 6)
- 6) If $x - y = 5$, $x + y = \frac{1}{5}$ then $x^2 - y^2 = \dots$
($\frac{1}{25}$, 1 , 5 , 25)

Second question :

- A) If $x = \{1, 3, 4, 5\}$, $y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from x to y where "aRb" means $(a + b = 7)$ for each $a \in x$, $b \in y$
- (1) Write R and represent it by an arrow diagram.
 - (2) Is R a function ? and why ?
- B) If $y \propto x$ and $y = 6$ when $x = 3$
- Find : (1) The relation between x and y
- (2) The value of y when $x = 5$

Third question :

- A) Represent graphically the function $f : f(x) = 4 - x^2$ taking $x \in [-3, 3]$ and from the graph deduce : The coordinates of the vertex point of the curve, maximum value of the function and the equation of line of symmetry.
- B) Find the positive number which its square is added to the antecedent of the ratio $29 : 46$ and subtracted its square from its consequent the ratio become $3 : 2$

Fourth question :

- A) If the straight line which represents the function $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = 6x - a$ intersects the y-axis at the point (b, 2). Find the value of a and b.
- B) The following frequency distribution shows the marks of the number of student in an exam :

Marks	0	1	2	3	4	5	6
Number of students	3	4	6	9	5	3	4

- Find the standard deviation of marks.

Fifth question :

- A) If $x = \{1, 3, 5\}$ and R is function on x and $R = \{(a, 3), (b, 1), (1, 5)\}$
 Find : (1) The range of the function.
 (2) The value of $a + b$.
- B) If a, b, c and d are proportional quantities prove that $\frac{a}{b-a} = \frac{c}{d-c}$

انتهت الأسئلة

الى كل طالب من طلاب المدارس لمرحلة التعليم الأساسي (عام) -
الى كل طالب من طلاب المدارس لمرحلة التعليم الأساسي (عام) -
الى كل طالب من طلاب المدارس لمرحلة التعليم الأساسي (عام) -
الى كل طالب من طلاب المدارس لمرحلة التعليم الأساسي (عام) -

(Calculator is allowed)

Answer the following questions:-

Question (1) : Choose the correct answer from those given:

The simplest dispersion measure is

- (a) the arithmetic mean (b) the median (c) the range (d) the Mode

$$2x^2 \times 3x = \dots$$

- (a) $6x^3$ (b) $5x^3$ (c) $6x^2$ (d) $5x^2$

$$\text{If } X = \{ 3 \}, n(Y) = 5 \text{ then: } n(X \times Y) = \dots$$

- (a) 1 (b) 5 (c) 8 (d) 15

The simplest form of the expression: $3x - 4y + 5x + 7y$ is

- (a) $7x + 12y$ (b) $11xy$ (c) $10x + 9y$ (d) $8x + 3y$

The relation which represents an inverse variation between the two

variables y and x is

- (a) $xy = 5$ (b) $y = x + 3$ (c) $\frac{x}{5} = \frac{y}{2}$ (d) $y = 2x$

If $\sqrt{x} = 4$ then: $x = \dots$ where $x \in \mathbb{Z}$

- (a) 2 (b) 4 (c) 8 (d) 16

Question (2):

- Graph the curve of the function $f(x) = x^2$ where $x \in [-3, 3]$, from the graph find:
- The maximum or the minimum value of the function.
 - The equation of the axis of symmetry.
- Find the standard deviation to the set of the values: 15, 19, 20, 21, 25.

Question (3):

- a) If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{5, 6\}$ find:
- $X \times Y$
 - $(X - Y) \times Z$

- b) If x, y, z and L are proportional quantities prove that: $\frac{y-x}{x} = \frac{L-z}{z}$

Question (4):

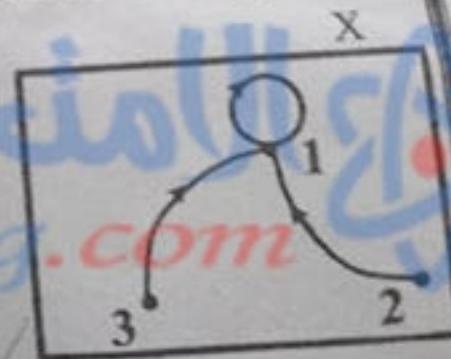
- a) Find the number which if add to both of terms of the ratio $3 : 5$ then it becomes $1 : 2$.

- b) The opposite figure: the arrow diagram represents the relation R on the set X

1- write R

$$R = \{(1, 1), (3, 1)\}$$

2- Is R a function? if it's, find its range.



Question (5):

- a) If $y \propto x$ and $y = 20$ as $x = 4$ find:

(1) The constant of variation between y and x .

(2) The value of x when $y = 40$

- b) If $f(x) = 2x + k$, $f(5) = 13$ find the value of k .
(أنت الأستاذ)

الامتحان تمهيداً لفم الارجاع الى كل طلاب كل المدارس في مصر - التعلم المعاصر في كل المدارس في مصر -
الامتحان تمهيداً لفم الارجاع الى كل طلاب كل المدارس في مصر - التعلم المعاصر في كل المدارس في مصر -
(Calculator is allowed)

Answer the following questions:-
Question (1) : Choose the correct answer from those given;

1 The simplest dispersion measure is
 (a) the arithmetic mean (b) the median (c) the range (d) the Mode

2 $2x^2 \times 3x =$
 (a) $6x^3$ (b) $5x^3$ (c) $6x^2$ (d) $5x^2$

3 If $X = \{ 3 \}$, $n(Y) = 5$ then: $n(X \times Y) =$
 (a) 1 (b) 5 (c) 8 (d) 15

4 The simplest form of the expression: $3x - 4y + 5x + 7y$ is
 (a) $7x + 12y$ (b) $11x + y$ (c) $10x + 9y$ (d) $8x + 3y$

5 The relation which represents an inverse variation between the two variables y and x is
 (a) $x \cdot y = 5$ (b) $y = x + 3$ (c) $\frac{x}{5} = \frac{y}{2}$ (d) $y = 2x$

6 If $\sqrt{x} = 4$ then: $x =$ where $x \in \mathbb{Z}^+$
 (a) 2 (b) 4 (c) 8 (d) 16

Question (2) :

- a Graph the curve of the function $f(x) = x^2$ where $x \in [-3, 3]$, from The graph
 find : (1) The maximum or the minimum value of the function.
 (2) The equation of the axis of symmetry.
- b Find the standard deviation to the set of the values: 15, 19, 20, 21, 25.

Question (3) :

- a If $X = \{ 3, 4 \}$, $Y = \{ 4, 5 \}$, $Z = \{ 5, 6 \}$ find:
 (1) $X \times Y$ (2) $(X \times Y) \times Z$
- b If x , y , z and L are proportional quantities prove that: $\frac{y-x}{x} = \frac{L-1}{1}$

Question (4) :

- a Find the number which if add to both of terms of the ratio $3:5$ then it becomes $1:2$
- b The opposite figure : the arrow diagram represents the relation R on the set X .
 1- write R .
 2- Is R a function ? If it's , find its rang.
- 

Question (5) :

- a If $y \propto x$ and $y = 20$ as $x = 4$ find:
 (1) The constant of variation between y and x .
 (2) The value of x when $y = 40$.
- b If $f(x) = 2x + k$, $f(5) = 13$ find the value of k .

Answer all the following questions:

Q 1 : Choose the correct answer :-

1) $\sqrt[3]{x^6} = \sqrt{\dots}$

a) x^3

b) x^2

c) x

d) x^4

2) If: $(X + 5, 8) = (1, 6y + X)$, then $y = \dots$

a) 5

b) 6

c) 2

d) 12

3) The solution set of the equation: $X^2 + 4 = 0$ in R is \dots

a) 4

b) ± 2

c) -2

d) 0

4) If: $xy = 7$, then $y \propto \dots$

a) $\frac{1}{x}$

b) $x - 7$

c) x

d) $x + 7$

5) If: $x^2 - y^2 = 16$ and $x + y = 8$, then $x - y = \dots$

a) 2

b) 1

c) 128

d) 64

6) If: $\sum(x - \bar{x})^2 = 36$ to the set of 9 values, then $\sigma = \dots$

a) 2

b) 4

c) 18

d) 27

Q 2 : a) Represent graphically the function f where $f(x) = (x - 2)^2$, $x \in [0, 4]$
From the graph, deduce .

1) The equation of the symmetry axis.

2) The maximum (minimum) values of the function.

b) If: $y \propto \frac{1}{x}$, and $x = 2 \frac{4}{5}$ when $y = \frac{6}{7}$. Find the value of y , when $x = 3 \frac{1}{5}$.

Q 3 : a) If: $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$. and R is a relation from X to Y,
where " $a R b$ " means " $2a = b$ " for each $a \in X$, $b \in Y$

1) Write R and represent it by an arrow diagram .

2) Is R a function ?

b) If: a, b, c and d are proportional , prove that: $3\sqrt[3]{\frac{5a^3 - 3c^3}{5b^3 - 3d^3}} = \frac{a + c}{b + d}$

Q 4 : a) If: $X = \{2, 4\}$, $Y = \{4, 0\}$, $Z = \{4, 5, -2\}$

Find : 1) $(Z - Y) \times (X \cap Y)$ 2) $n(X^2)$

b) If: $f(x) = 4x + b$, $f(3) = 15$, Find the value of b

Q 5 : a) If: $\frac{a}{2x+y} = \frac{b}{3y-x} = \frac{c}{4x+5y}$, Prove that: $\frac{a+2b}{7} = \frac{4b+c}{17}$

b) Find the standard deviation for this distribution :

X	Zero	1	2	3	4	5	Total
K	3	16	17	25	20	19	100

(انتهت الأسئلة)



Algebra and statistics

⌚ Time : 2 Hours

Answer the following questions

First question ↳ Choose the correct answer:

① Double the number 2^8 is

- a) 2^{10} b) 2^{16} c) 4^8 d) 2^9

② If $x \cdot y = 3$ then $y \propto$

- a) x b) $3x$ c) $\frac{1}{x}$ d) $\frac{1}{3}x$

③ If $x^2 + y^2 = 25$, $(x+y)^2 = 49$, then $xy =$

- a) 6 b) 10 c) 12 d) 24

④ If $f(x) = 3$ then $f(3) + f(-3) =$

- a) 0 b) 1 c) -6 d) 6

⑤ $]-2, 5[\cup \{-2, 5\} =$

- a) $[-2, 5]$ b) $[-2, 5[$ c) $]-2, 5]$ d) $]-2, 5[$

⑥ The range of the set of the values: 5 , 14 , 4 , 23 , 15 is

- a) 12 b) 14 c) 19 d) 23

Second question ↴

A) If $X = \{2, 5\}$; $Y = \{1, 2\}$, $Z = \{3\}$

then find: First: $n(X \times Z)$

Second: $(Y \cap X) \times Z$

B) If $f(x) = 4x + b$, $f(2) = 10$

then find the value of b .

Third question ⬤

A) If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where $a R b$ means " $a = \frac{b}{2}$ " for each of $a \in X$,

$b \in Y$ write R and represent it by an arrow diagram.

Is R a function? and why?

B) Find the number which if added to the two terms of ratio $7 : 11$ it will be $2 : 3$.

Fourth question ⬤

A) If $2a = 3b = 3c$ then find the numerical value of:

$$\frac{6a + b + c}{4a + 6b + 6c}$$

B) Calculate the standard deviation for the following values:

55, 53, 57, 56, 54.

Fifth question ⬤

A) If $y \propto x$ and $y = 6$ when $x = 3$ find:

First: The relation between x , y

Second: The value of y when $x = 4$

B) Represent graphically the curve of the function

$f(x) = 4 - x^2$ where $x \in [-3, 3]$ and from the graph deduce the vertex of the curve and the equation of the symmetry axis.

Third Year Preparatory Examination

(First Term, January, 2018)

Time : 2 Hours

Algebra

Answer the following questions :

Choose the correct answer from those given:

- 1 ✓a The range of the set of values 8, 2, 5, 9 and 6 equals (4, 5, 6, 7)
 ✓b If $4a - 3b = 0$ then $a:b = \dots$ (3:4, 3:7, 4:3, 4:7)
 ✓c If $x-y=2$, $x+y=6$ then $x^2-y^2 = \dots$ (3, 4, 8, 12)
 ✓d If $\frac{y}{x} = 5$ then $y \propto \dots$ ($\frac{1}{x}$, x, $\frac{1}{x^2}$, $x+5$)
 ✓e The fourth proportional of the numbers 2, 3, 4 is (6, 7, 8, 9)
 ✓f If $(3^x, \sqrt{y}) = (1, 4)$ then $x+y = \dots$ (2, 3, 16, 17)

- 2 ✓a If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{5, 6, 7\}$.

Find: (1) $X \times (Y \cap Z)$. ((3,5), (5,5)) (2) $n(Y \times Z)$.

- ✓b If a, b, c and d are proportional quantities then Prove that: $\frac{a^2+c^2}{b^2+d^2} = \frac{ac}{bd}$

- 3 ✓a If $X = \{1, 2, 3\}$, $Y = \{3, 4, 5, 7\}$ and R is relation from X to Y where $a R b$ means : $b = 2a + 1$ for each $a \in X$, $b \in Y$. ((1,3), (2,5), (3,7))

Write R and represent it by an arrow diagram. Is R a function? And Why? Yes, because

- ✓b If $y \propto \frac{1}{x}$ and $y=3$ when $x=4$.

Find: (1) The relation between x and y . $y = \frac{12}{x}$ or $12/x$

- (2) The value of x when $y=6$. 2

- 4 ✓a If the point $(2, 5)$ is located on the straight line represented to the function $f: R \rightarrow R$ where $f(x) = kx + 3$. Find the value of k and Find the point of intersection of the straight line by the x -axis. ((-3,0))

- ✓b Represent graphically the curve of the function f where: $f(x) = x^2 + 2x + 1$ taking $x \in [-4, 2]$ and from the graph deduce:

- (1) The vertex of the curve. ((-1,0))

- (2) The maximum or minimum value of the function. (2)

- (3) The equation of the line of symmetry. ($x=-1$)

- 5 ✓a If b is the middle proportional between a and c , prove that $\frac{a-b}{a-c} = \frac{b}{b+c} \cdot \frac{m}{m}$

- ✓b Calculate the standard deviation for the values: 16, 32, 5, 20, 27.

$$\bar{x} = 20 \quad \sigma = 9.316$$



Algebra and statistics

⌚ Time : 2 Hours

Answer the following questions

First question ⇒ Choose the correct answer:

- ① If $x = 3$, $y = 5$ then find the value of $y^x = \dots$
 - a) 15
 - b) 243
 - c) 125
 - d) 8
- ② The range of the set of the values 45, 75, 65, 95, 35, 55 equals
 - a) 30
 - b) 40
 - c) 50
 - d) 60
- ③ The value of $(\sqrt{5} - 3)(\sqrt{5} + 3) = \dots$
 - a) -4
 - b) 4
 - c) 2
 - d) 8
- ④ If y varies inversely with x then
 - a) $y = x$
 - b) $y = mx$
 - c) $x = my$
 - d) $y = \frac{m}{x}$
- ⑤ If the radius of a sphere 3 cm then its volume = cm^3
 - a) 4π
 - b) 36π
 - c) 36
 - d) 27π
- ⑥ If the point $(a - b, 5)$ is located on the Y-axis then
 - a) $a = b$
 - b) $a + b = 0$
 - c) $a \neq b$
 - d) $a - b = 5$

Second question ↓

A) If $(x - 2, 3) = (5, 3y + 1)$ then find the value of x, y .

B) If $a \propto b$ and $a = 3$ when $b = 2$ Find:

1) The relation between a, b .

2) The value of a when $b = \frac{2}{3}$

Third question ↓

A) If $X = \{3, -2\}$, $Y = \{1, -4, 5\}$ find :

$$\frac{10}{3+2+5} = \frac{10}{9}$$

1) The cartesian product $X \times Y$.

2) Represent the cartesian product by a cartesian diagram.

B) If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{3a - 2b + 5c}{5x}$ find the value of x .

Fourth question ↓

A) If $X = \{1, -2, 3\}$, $Y = \{-8, -2, 2, 8\}$ and R is a relation from X to Y where $a R b$ means " $b = 2a - 4$ ", for each $a \in X$, $b \in Y$ then :

First : Represent an arrow diagram of R .

Second : Show that why R is a function from X to Y .

Third : If $a R 8$ then find a .

B) If $5a = 3b$ then find the value of $\frac{7a + 9b}{4a + 2b}$

Fifth question ↓

A) The following frequency distribution shows the ages of 10 children

Ages in year	5	8	9	10	12	Total
No. of children	1	2	3	3	1	10

Calculate the standard deviation to ages in years.

B) Represent graphically the quadratic function f where :

$$f(x) = x^2 - 4x + 3, \quad x \in \mathbb{R} \quad \text{where } x \in [-1, 5]$$

then find : 1) The equation of the symmetry axis.

2) The minimum value of the function.



The ministry of education

**CERTIFICATE OF
COMPLETION OF THE STUDY
OF THE BASIC EDUCATION
STAGE
THE THIRD YEAR PREPARATORY**

First term - Jan. 2018

subject: algebra & statistics
الجبر والاحصاء
الترجمة (الانجليزية)

CONT.

**CERTIFICATE OF COMPLETION OF THE STUDY
OF THE BASIC EDUCATION STAGE
THE THIRD PREPARATORY
JAN. 2018 - Algebra & statistics
THE SECOND PAGE**

Answer all questions

Calculator is permitted

Time : 2 hours

Questions in two pages

Q(1):

A) choose the correct answer from those given:

1- If $x = \{1, 3, 5\}$: R is a function on X :

$$R = \{(A, 3); (B, 1); (1, 5)\} \text{ then } A+B = \underline{\hspace{2cm}}$$

- A) 4 B) 6 C) 8 D) 2

2- If $(L - 3, 2)$ lies in first quadrant, then L may be equal $\underline{\hspace{2cm}}$

- A) $\frac{3}{2}$ B) 2 C) $\frac{9}{2}$ D) 0

3- If $2A = 3B$, then $\frac{A}{B} = \underline{\hspace{2cm}}$

- A) $\frac{3}{2}$ B) $\frac{2}{3}$ C) $\frac{9}{4}$ D) $\frac{4}{9}$

B) If $X^2 Y^2 - 4XY = -4$, prove that : x varies inversely as y .**Q(2):**

A) Choose the correct answer from those given :

1- The simplest dispersion measurements is

[The arithmetic mean or The Standard deviation or The median or The range] O

2- If $(a, 2) \in$ straight line $Y = 3X - 4$, then, $a = \underline{\hspace{2cm}}$

$$\begin{aligned} 3a - 4 &= 2 \\ 3a &= 6 \\ a &= 2 \end{aligned} \quad [2 \text{ or } 3 \text{ or } 4 \text{ or } 7]$$

3- If $n(X) = 2$, $n(X \times Y) = 8$, then $n(Y^2) = \underline{\hspace{2cm}}$

$$[4 \text{ or } 2 \text{ or } 16 \text{ or } 8]$$

B) Which number added to terms of ratio $7:12$ to become $2:3$?**Q(3):**A) Find standard deviation for values $2, 5, 6, 8, 9$.B) The straight line which represent $F: R \rightarrow R$, where

$$F(x) = 3x + a \text{ cut y-axis at point } (b, 7).$$

Find the value of : $2a - 5b$.**Q(4):**

$$A) \text{ If } \frac{A}{4} = \frac{B}{5} = \frac{C}{3}, \text{ Prove that } \frac{A-B+C}{A+B-C} = \frac{1}{3}.$$

B) If $X = \{1, 2\}$; $Y = \{0, 2, 3\}$ R is A relationfrom $X \rightarrow Y$ such that aRb means " $a+b = \text{prime number}$ " for each $a \in X; b \in Y$. write R , represent it by arrow diagram.

Is R function ? or not ?

Q(5):A) If $(3-x, y+2) = (-4, 4)$, find the value of $\sqrt{x+y}$

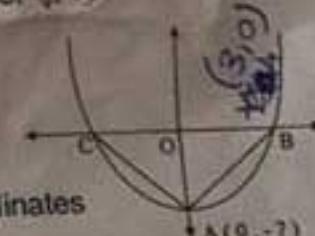
B) The opposite figure represent function

$$F(x) = Lx^2 - 7, \text{ the area of triangle}$$

$$\Delta ABC = 21 \text{ cm}^2, A(0, -7) \text{ find coordinates}$$

of point B then find the value of L

The end of questions



امتحان شهادة إتمام الدراسة لمرحلة التعليم الأساسي
الفصل الدراسي الأول - ت. ٢٠١٧ - ت. ٢٠١٨
الermen : ساختان
الجبر والحساب باللغة العربية

(Calculator is allowed)

نسمح باستخدام الآلة الحاسبة

Answer the following questions:-

Question (1) : Choose the correct answer from those given:1 If : $n(X) = 3$ and $n(X \times Y) = 12$, then $n(Y) = \dots$

- (a) 4 (b) 9 (c) 15 (d) 36

2 The arithmetic mean of the set of values : 2 , 3 , 4 , 6 , 10 is.....

- (a) 4 (b) 5 (c) 8 (d) 25

3 If the point $(5, b - 7)$ lies on X-axis, then $b = \dots$

- (a) -2 (b) 2 (c) 7 (d) 12

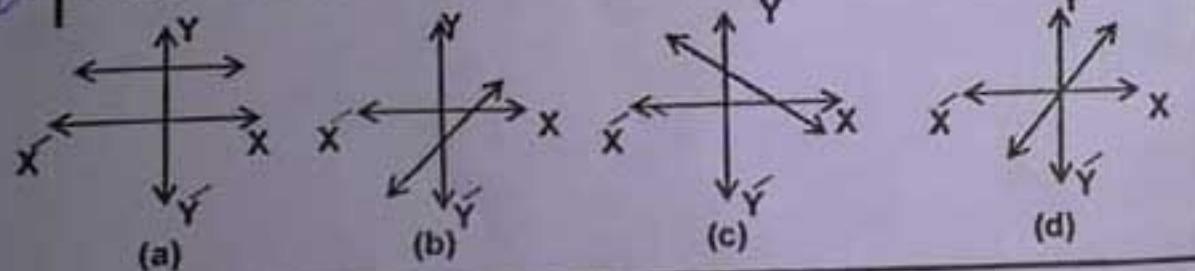
4 If : $f(x) = 3$, then $f(-5) - f(5) = \dots$

- (a) 6 (b) 1 (c) zero (d) -1

5 If : $a, 3, b, 5$ are proportional quantities, then $\frac{a}{b} = \dots$

- (a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) 2 (d) 8

6 The graphical form which represents the direct variation between X and Y is : ...

Question (2) :a If : $(x^5, y - 1) = (32, \sqrt[3]{27})$, then find :

The value of each x and y

(يعني الأسلمة في المجموعة الثانية)

b If $X = \{1, 2, 3\}$, $Y = \{12, 47, 53\}$ and R is a relation from X to Ywhere aRb means "a is a digit from the digits of b" for all $a \in X, b \in Y$.

(1) Write the relation R and represent it by an arrow diagram.

(2) Show that R is a function from X to Y then find its range.

Question (3) :a If : $\frac{a}{2} = \frac{b}{5} = \frac{c}{7}$, then prove that $\frac{5b - 3c}{2c - 3a} = \frac{1}{2}$ b Graph the curve of function f , where $f(x) = x^2 - 2x$ in the interval $[-2, 4]$, from The graph determine :

(1) The minimum value of the function.

(2) The equation of the axis of symmetry of the curve .

Question (4) :

a If b is the middle proportional between a and c, then :

$$\text{prove that: } \frac{a^2 + b^2}{b^2} = \frac{b^2 + c^2}{c^2}$$

b If the point $(a, 3)$ lies on the straight line which represents the function $f(x) = 4x - 5$, then find the value of a .Question (5) :a If y varies directly as x and $y = 6$ as $x = 2$ find :The relation between x and y, then find The value of y when $x = \frac{1}{3}$

b The following tables shows the distribution of ages of 10 children in years :

The age in years	5	8	9	10	12	Total
Number of children	1	2	3	3	1	10

Find the standard deviation of the ages in years.

(انتهت الأسئلة)